1.30.12.

Library of the Theological Seminary,

PRINCETON, N. J.

Purchased by the Mary Cheves Dulles Fund.

Division DT425

Section B64

Digitized by the Internet Archive
in 2017 with funding from
Princeton Theological Seminary Library

https://archive.org/details/manbeastineaster00blan

MAN AND BEAST IN EASTERN ETHIOPIA

MACMILLAN AND CO., LIMITED
LONDON . BOMBAY . CALCUTTA
MELBOURNE

THE MACMILLAN COMPANY
NEW YORK . BOSTON . CHICAGO
ATLANTA . SAN FRANCISCO

THE MACMILLAN CO. OF CANADA, LTD.
TORONTO

MAN AND BEAST IN EASTERN ETHIOPIA

From Observations made in British East Africa, Uganda, and the Sudan

LIBRARY OF PRINCETON
JAN 30 1912
THEOLOGICAL SEMINARY

BY

J. BLAND-SUTTON, F.R.C.S.Eng.

With Two Hundred and Four Engravings on Wood

MACMILLAN AND CO., LIMITED
ST. MARTIN'S STREET, LONDON
1911

Richard Clay and Sons, Limited,
brunswick street, stamford street, s.e.
and at bungay, suffolk.

CONTENTS

	PAGE
INTRODUCTION	1
I.—MOMBASA	4
II.—THE UGANDA RAILWAY	15
III.—THE VICTORIA NYANZA	27
IV.—ARCHIPELAGOES AND ISLANDS OF THE LAKE	41
V.—UGANDA	56
VI.—KAMPALA	68
VII.—DRUMS	83
VIII.—MASAI	92
IX.—WA-KIKUYU	105
X.—ORNAMENTS FOR EARS AND LIPS	118
XI.—NDOROBO	131
XII.—KAVIRONDOS	140
XIII.—ETHIOPIAN FASHIONS IN HAIR-DRESSING	156
XIV.—ON SAFARI	166
XV.—AN UNCAGED ZOO	180
XVI.—THE LION	201
XVII.—THE CROCODILE	213
XVIII.—THE CRATERS OF THE RIFT VALLEY	226
XIX.—THE RIFT VALLEY AND ITS LAKES	243
XX.—THORNS	252
XXI.—HORNS	266
XXII.—ANTELOPES	276
XXIII.—GAZELLES AND COBS	287

PAGE

XXIV.—GNUS AND DUIKERS 299

XXV.—PESTS: JIGGERS, TICKS, AND MOSQUITOES 307

XXVI.—FLIES AND SLEEPING SICKNESS 318

XXVII.—TERMITES (WHITE ANTS) 327

XXVIII.—BEAKS 337

XXIX.—CRESTS 354

XXX.—TAILS 367

XXXI.—IVORY 387

XXXII.—HIPPOPOTAMUS 405

LIST OF ILLUSTRATIONS

	PAGE
Porter with an elephant's tusk	3
An Arab doorway, Mombasa	5
Papaw tree	7
Baobab tree	9
Castor Oil plant	10
Gecko	12
Thomson's Gazelle	16
Parasitic Ficus	19
Water-carrier	24
Nandi woman and baby	25
Iron twisted by an elephant	26
Bagrus docmac	28
Screaming Sea-Eagle	29
Speke's Antelope	34
Mud-fish	36
Head of Mud-fish	37
Mud-fish in its Cocoon	38
Papyrus raft	39
Victoria Nyanza (map)	42
Fetish Hut	47
Uganda boat	49
Sesse boat on the lake	51
Hippopotamus harpoons	53
Hippopotamus and calf	55
Banana	61
Banana leaves	63
Boy collecting termites	64
Scaly anteater	65
Spirit-shelter	67

PAGE

Ant-hill 69
Chameleons 73
Mutesa's tomb and Mutesa's grave 74
The Thatched Cathedral and drummery 77
Interior of the Uganda Cathedral 78
St. Paul's Cathedral, Uganda 79
Hannington's Raven 80
Uganda drum 84
Women drummers at Suna's tomb 85
Sesse Guitar 87
Ashantee fetish drum 88
Church drums 90
Niam-Niam war drum 91
Masai warrior 93
Masai arm-clamp 94
Masai woman 97
Masai bleeding an ox 99
Masai Bull 101
Honey barrel 106
Gallipot as an ear-ornament 107
Honey barrel in a tree 108
Woman carrying wood 110
Kikuyu woman pounding grain 111
Kikuyu woman with many ear-rings 112
Ear ornament 114
The Spotted Hyæna 115
Skull of hyæna 116
External ear, or pinna 119
Ear of a Masai 120
Stone ball for the ear 121
Ear stone *in situ* 122
Masai ear-ring 123
Ear with reeds in it 124
Ear with wooden plug 125
Woman with a labret and ear plugs 127
Murle woman with labret 128
A pelélé 130
Ndorobo elephant spear 132
Ndorobo with ear buckets 133

PAGE
Ndorobo fire-making 136
Colobus Monkey 138
Kavirondo woman with tassel 141
Kavirondo's tail 142
Kavirondo matron 144
Ja-luo girl 145
Kavirondo women with fish-baskets 147
Stone wall of a Kavirondo village 148
Interior of a Kavirondo village 149
Unmarried Kissii girl 150
Kavirondo milkmaid 151
Kavirondo charms 153
Doorway in the wall of a village 155
Kikuyu man with a paunch cap 157
Masai mode of hair-dressing 158
Nandi dandy 159
Suk with chignon 160
Shilluk dandy 160
Dodinga head-dress 162
Mashukulumbi chignon 163
Ja-luo hair fashion 164
Ja-luo ear-rings 164
Head of Reed-buck 170
The Flamingo 171
Head of Wart-Hog 172
The Impalla 174
The Serval Cat 175
The Silent Lake with Ibis and Hippopotamus 178
Serval Kitten 179
Aard-vark or Antbear 185
Defassa Waterbuck 186
Grant's Zebra 188
Donkey with cross stripes on the legs 189
Oxpeckers 193
Coney 195
Honey-guide 197
Organ Shrike 198
Speke's Black metal-toned Whistler 199
Prickle on the lion's tail 203

PAGE

Crocodile 214
Head of young Crocodile 215
Teeth of a Crocodile 216
Skull of Crocodile 218
Monitor 220
Plover 221
Buff-backed Heron 222
Danger at the Pool 223
Giant Lobelias 227
Lobelia ground 230
Giant Groundsel 234
Lobelia ground on Ruwenzori 238
Flower column of a Giant Lobelia 241
Ambatch Canoe 248
The bow-string hemp 253
Sisal Plant 254
Acacia thorns 256
Leaf of a willow with stipules 258
Candelabra euphorbia 260
Kigelia tree 263
Antelope's skull and horn-core 268
Skull of Roan Antelope 270
Skull of Hartebeest 271
Skull of Bubaline Antelope 272
Tail of African Elephant 274
Head of Chameleon with three horns 275
Bushbuck 278
Bongo 279
Kudu 281
Elands 282
Oryx 284
Horn sheath of Kudu 285
Grant's Gazelle 289
Gerenuk 291
Steinboks 292
Head of Dik-dik 293
Karamojo necklace 294
Oribi 295
Waterbuck 296

PAGE

Horns of Mrs. Gray's Waterbuck 297
Gnu 300
Heads of Gnus 301
Hartebeest on ant-hill 302
Duiker 303
Wild Dog 305
Sand Flea 308
Tick 310
Mosquito 315
Tsetse Flies 320
Fossil tsetse-fly 321
Trypanosomes 323
Tsetse-fly 326
Termites 328
Queen 329
Ant-hill of unusual shape 333
Aard-Wolf 335
Skull of Aard-Wolf 336
Open-bill 338
Shell of Ampullaria 339
Hornbills 341
Head of Ground Hornbill 342
Whale-headed Stork 344
Darter 345
Marabou Stork 348
Head of Skimmer 350
Skimmer 352
Hammerhead 357
Secretary Bird 358
African Hoopoe 359
European Hoopoe 360
Great Crested Touraco 361
Head of Crowned Crane 363
Crowned Crane 364
Helmet Shrike 365
Weaver Finch 369
Weaver Finch (dancing) 370
Mouse Bird 372
Shrike 373

PAGE

Sunbirds 374
Tecoma flowers 375
Crested Bustard and Bee-eater 378
Coucal 381
Racket-winged Nightjar 382
Pennant-winged Nightjar 383
Long-tailed African Dove 385
Buff-backed Heron on an elephant 389
Musket ball surrounded by secondary dentine 392
Elephant trap 394
Spear in an elephant's tusk 395
Spiral tusks 397
Ivory panel. B.C. 850–700 398
Fetish tusk-trumpet 399
Elephant's tusk in transverse section 401
Musket ball in the pulp chamber of a tusk 403
Hippopotamus 406
Skull of hippopotamus 407
Circular tusk of hippopotamus 409
Thorn in the foot 411

MAN AND BEAST IN EASTERN ETHIOPIA

INTRODUCTION

A STUDY of the distribution of animal life over the globe, especially in regard to birds, has taught zoologists that the division of the Earth into hemispheres and continents is not convenient for their purpose.

In 1857, Sclater suggested a division of the world from an ornithological point of view into six regions; Africa, a part of Arabia, and Madagascar constitute the important Ethiopian Region. The revival of the name Ethiopia is a happy event. The ancient Greeks called a large tract of north-eastern Africa Ethiopia; to them it was a land of magic and mystery. To Europeans in the twentieth century large tracts of the African continent remain mysterious. From a zoological standpoint the Ethiopian Region is one of the most remarkable on the globe. Those parts of it known as the British East Africa Protectorate and the Uganda Protectorate (thanks to the Uganda Railway) have been rendered accessible to all men and women interested in the native races of these two countries, as well as the mammalian and avian forms which have lived there almost undisturbed by man from remote periods. I say undisturbed by man, because it will be obvious to those who visit the great meridional trench known as the Rift Valley that the district has been the seat of volcanic disturbance on a stupendous scale within a comparatively recent period. In the immediate vicinity of the valley

there are many extinct volcanoes, and the craters of some contain forests in which mighty beasts, such as lions, elephants, and elands, roam. Dotted along the trench are numerous lakes, the resort of immense numbers of birds, including some of the strangest forms living on the earth to-day, and also the biggest.

The lion dominates the "rolling seas of grass"; the rhinoceros shows resentment to trespassers among the bushes and scrub; elephants use the dense forests as retreats; and crocodiles lie in wait in nearly all the lakes and rivers, ready to drown any unwary man, beast, or bird that comes within reach of their dangerous, trap-like jaws or treacherous tails.

Anxious to see something of Eastern Ethiopia I made a journey, accompanied by my friend and colleague Dr. Comyns Berkeley, to the Victoria Nyanza. We started from Mombasa, and in due course reached the lake and visited its northern shore. On the return journey we went "On Safari" in the Rift Valley. Whilst writing this book I realised that some subjects discussed in it could be made clearer by a visit to that part of the Nile which courses through the torrid Sudan, especially the Sudd region around Lake No. With this object I made a boat journey up the White Nile and the Bahr-el-Gebel as high as Rejaf. This journey was full of interest, for the Nile Valley is a convenient highway for European birds seeking comfortable winter quarters in the forest and lake regions of the Rift Valley. In this book I describe my impressions in a series of essays. Seven of these deal with Mombasa, the Uganda Railway, the Victoria Nyanza, and Uganda; seven with the natives we met during our visit, such as the Masai, Wa-Kikuyu, Ndorobo, and Kavirondo, including an account of their curious ear ornaments and modes of hair-dressing. A description of the natural features of the Rift Valley occupies ten essays, under the titles of Crater, Lakes,

Lions, Crocodiles, Thorns, Horns, Antelopes, etc. Some of the extraordinary birds are described under the titles of Beaks, Crests, Tails, and Wings.

British East Africa is a "land of unsettled problems," and Uganda abounds in ticks, jiggers, tsetse-flies, and gnats—a dreadful set of pests for man and beast. These scourges are here considered, as well as one of the greatest curses of Africa—ivory.

A large tusk is a load for a porter.

I

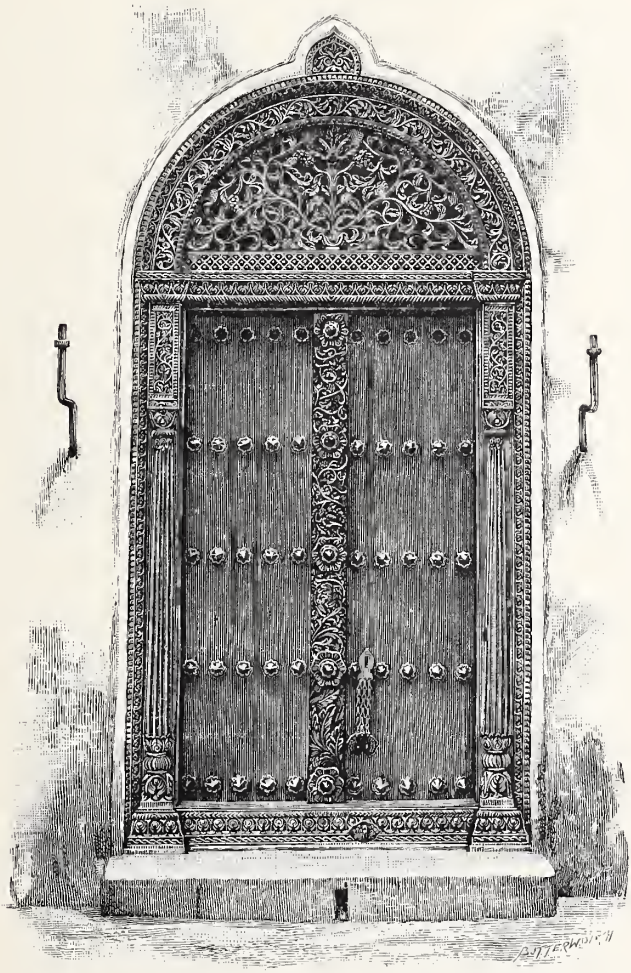
MOMBASA—THE GATE BY WHICH COMMERCE AND CHRISTIANITY ENTERED EAST AFRICA

It is undeniable that after spending fifteen days on the high seas the eyes and the mind grow weary of the apparently interminable watery part of the world surrounding the ship. Watch the excitement among the passengers when the news "land in sight" travels round the decks, saloons, and smoking-room. I am convinced that the majority of passengers soon grow weary of the sea, even when the weather is uniformly fair and sunny: some of them become quarrelsome; many pass sleepless nights, especially in tropical and subtropical regions, and few really enjoy themselves. When the weather is bad and the ship "pitches" or "rolls," and more especially when the decks are awash, the lot of the passenger is often very uncomfortable, and those who are not sea-sick are honestly "sick of the sea." Under such conditions, instead of being elated with the interminable procession of roaring waves, they will, with honest old Gonzalo, freely give "a thousand furlongs of the sea for an acre of barren ground; long heath, brown furze, anything."

We had spent seven days in an uncomfortable ship; its deck was hampered with mules from Somaliland and with pilgrims. It is true we saw on the way the mighty Cape Guardafui, which lacks a lighthouse, much to the advantage of the natives living along the coast, who, like the Cornish wreckers of olden days, thrive on

stranded ships. But this merely increased our delight when the ship entered the narrow old harbour of Mombasa at daybreak.

The white people in Mombasa are mainly English



Many of the houses are well constructed and bear unmistakable evidence of an Arab origin ; there are several interesting old doors and doorways.

officials, traders, and agents. During the construction of the Uganda Railway, it was necessary to import twenty thousand men from India, chiefly Punjabis. On the completion of the railway the Indians settled in the country and became store-keepers, clerks, cooks, engine drivers, stokers, carpenters, artisans, station-masters, telegraphists, and moneylenders. In consequence Indians abound throughout the inhabited parts of the British East Africa Protectorate. They are shrewd, enterprising, and thrifty. This wholesale introduction of Indians explains the nature of the currency, for rupees, annas, with cents to replace pice, constitute the mechanism of exchange.

The black (native) population consists of Swahilis and Arabs. The native quarter is situated on the part of the town facing the harbour. The houses are built of wattle and dab and thatched with dry grass. This part of the town is traversed by narrow streets such as prevail in the native quarters of towns in Eastern countries. Many of the houses, especially those occupied by the Indians, are well constructed and bear unmistakable evidence of an Arab origin ; there are several interesting old doors and doorways. The native town has a commodious fish market and an interesting vegetable market. Each is worth an occasional visit, for curious fishes and fruits may often be seen there.

Many towns and islands which present an artistic and alluring prospect from the sea are woefully disappointing on landing. This is not the case with Mombasa. We landed on the second day of the New Year and found Vasco da Gama Street adorned with the flamboyant gold mohur in full flower. The brilliant purple bougainvillea grew around and covered the walls of houses, hid the clumsy wooden pillars of the verandahs, entwined itself along rudely arranged trellis-work, adorned the gardens of the Law Court, and decorated the weird and massive trunks of the mighty leafless baobabs. Few men have their names so exquisitely

preserved as is the case with the great French circumnavigator Bougainville, who introduced this beautiful plant into the Eastern hemisphere from South America.

The Papaw tree (*Carica papaya*) with its curious fruit sessile on the upper part of the stem. The tree attains a height of 5 metres (20 feet).

An excellent road traverses the island from the old port to Kilindini. It is bordered by huge mango trees

rich in foliage and fertile with fruit. Alternating with the mango trees are groups of cocoa-nut palms with their fruit ripening in the sun, and the Papaw tree (*Carica papaya*) with its curious fruit sessile on the upper part of the stem. The male flowers are borne on a separate tree from that which bears the fruit. The papaya fruit when ripe is edible, but does not deserve the epithet "delicious" so thoroughly merited by the fruit of the mango. The fruit of the papaw is considered to aid digestion, and it has been proved that the milky sap (latex) which exudes from its stem and leaves contains a ferment (papayotin) resembling pepsin: it is also averred that if meat be wrapped in its leaves two hours before being cooked it becomes tender.

The baobab, or monkey bread tree, abounds on the island and adjacent coast land. This, the biggest tree in the world, was named *Adansonia digitata* after Adanson, the celebrated botanist. I measured the circumference of the trunk of some of these trees, and found several in which it exceeded sixty feet. Examples have been recorded with a girth of one hundred and twelve feet. These trees only bear leaves during the rainy season, and the bare branches with the pendulous fruit look very weird, and as they stretch heavenward recall strongly the human beings transformed into trees as represented in Gustav Doré's illustration of Dante's seventh circle of the Inferno. There is good excuse for the opinion held by some of the native tribes that these fantastic trees are inhabited by ghosts. The baobab is useful to the natives, for they eat the fruit, and the outer shell forms an excellent calabash which is in great demand for making water buckets, but its wood is light, soft, and useless. The most northern baobab grows in the Palace garden, Khartoum: it was planted by Schweinfurth.

It is worth while when the tide is out to walk down to the shore of the old harbour; this is quite a simple matter, for a pathway leads to the shore by the side of

the old fort built by the Portuguese and now used as a jail. It has been already mentioned that Mombasa is a coral island, and has, like the adjacent coast, a fringing reef. When the tide is out, it is easy to walk across the reef which is then covered by a few inches of water:

The Baobab or Monkey Bread Tree.

even at high tide the water is only a few feet in depth, but in the comparatively narrow interval between the reef fringing the land and that surrounding the island, the water suddenly attains a depth of sixteen fathoms. This makes it necessary for navigators to exercise

extreme care in entering the harbour. The dangers encountered by a ship threading its way along this narrow channel were well illustrated at the time of my visit, for a steamship was lying high upon the reef immediately under the lighthouse, and as all efforts to remove the ship into deep water had proved unavailing, the vessel was being dismantled.

The Castor-oil Plant (*Ricinus communis*) is sure to attract attention.

It is instructive, also amusing, when the tide is low to walk over the reef among the half-exposed rocks and examine the marine life occupying the pools or lurking under the movable pieces of rock. Such pools and recesses are occupied by hundreds of crabs; as they

scuttle away sideways and with astonishing quickness it requires some alertness on the part of the collector to catch them.

The parts of the islands immediately bordering the sea are thick with vegetation, and the castor-oil plant (*Ricinus communis*) is sure to attract attention. Another common plant is the Cape gooseberry. The wealth and beauty of the butterflies flitting among the plants soon impress the visitor with the fact that he is in a tropical region. The birds, too, are interesting, especially the weaver finches, some of which build their nests in the branches of the bougainvilleas that grow in the gardens bordering the roadway; even in those which overhang it. The comparative security of birds is shown by the freedom in which they build in the haunts of men. The verandah of the Court of Justice is adorned by the nests of swallows.

Every part of this fertile island teems with life, animal and vegetable. My visits to the club used to interest me, for pretty weaver finches flit through the branches of the trees in the club gardens, lizards ran along the railings, and in the silence of the library it was amusing to watch geckoes dart across the ceiling catching flies.

In the short evening hour the European population takes the air. The chief mode of locomotion is the jinricksha, but there is a narrow trolley-way running across the island to Kilindini with lateral branches to official residences. The small cars which run on these lines are pushed by native boys. These cars and jinrickshas are very useful, especially as there are no horses.

There is a cosmic phenomenon of some interest which can be seen and studied in the Indian Ocean and throughout the East far better than in England, namely the zodiacal light. Shortly before the dawn, a lenticular patch of soft white light, with its base on the eastern horizon and its apex pointing to the zenith,

is seen exactly over the spot where the sun is about to appear. The extent and intensity of the luminuos

In the silence of the library it was amusing to watch a gecko dart across the ceiling catching flies. The inset shows the lamellæ which enable it to climb easily and quickly smooth vertical surfaces.

area vary greatly, and the variations depend very much on the condition of the atmosphere. In the evening, about an hour after sunset, a similar luminous cone appears in the sky at the place where the sun has just quitted the horizon.

The zodiacal light is visible in Northern latitudes in the morning during the months of September and October, and in the evening during February and March. For many years I have watched for this cone of light in England and never felt satisfied that I had seen it. In 1903, when I was watching from the deck of a ship in the Indian Ocean in order to see the planet Mercury rise shortly before the dawn, the eastern sky was illuminated by a large triangular area of soft white light, so bright that I hastily looked at my watch fearing lest I had come on deck too late, and had missed my opportunity of seeing Mercury. To my great astonishment this beautiful luminous area contracted, shortened, and faded away; the darkness again became profound until the true dawn. Then, realising that I had seen the "false dawn," the lines of Omar's quatrain came instinctively to my lips:—

> Before the phantom of False morning died,
> Methought a voice within the tavern cried
> "When all the Temple is prepared within,
> Why nods the drowsy Worshipper outside."

I have often watched on deck in the early morning when crossing the Indian Ocean, but have never seen the light so intense as on this occasion. A captain who had spent many years in traversing this ocean told me that one morning when lying outside an Indian harbour, with a difficult entry, waiting for the dawn, the "false dawn" was so bright that he mistook it for the real dawn, and, having weighed anchor, proceeded to steam into the harbour, but the light faded and he had to await the real dawn.

The "false dawn" or dawn's "left hand," as it is sometimes called in the poetical imagery of the East, is of some concern to the muezzin who wakes the "drowsy worshipper" by shouting from the minaret. The Mahomedan day begins with the real dawn, an

important moment in connection with the fasting during Ramadan.

The zodiacal light is often brilliant in the evening, especially in the neighbourhood of the equator, and it persists longer than the morning form. When the moon shines in the early morning it is difficult to distinguish the false dawn with certainty; when Venus is a morning or an evening star, her rays are sufficient to obscure the zodiacal light. The brilliancy of those stars which lie in the luminous triangle is in no way diminished.

In Mombasa the stars sometimes shine with extraordinary brilliancy, and it is an impressive sight to see Orion glittering in the zenith, with Sirius, Fomalhaut, and the Southern Cross, in the east, and the Great Bull "low on the Western Main."

Among other natural phenomena of the tropics which appeal to those visiting these regions for the first time, mention may be made of the great width and vividness of the rainbow; the rapidity with which the sun appears to rise above or slip below the rim of the horizon at sunrise and sunset, and the briefness of the twilight. It is true that in order to appreciate the cosmic as well as the biologic aspects of countries on, or near, the equator "they must be seen with northern eyes."

II

THE UGANDA RAILWAY

U. R. These are the initials of one of the most romantic railways in the world. It starts from Mombasa and follows in the main the old caravan route to Kavirondo. After many difficulties encountered in its construction and a great expenditure of money, the first locomotive ran into Kisumu (Port Florence), on the Victoria Nyanza, in December, 1901. The distance from the sea-coast to the terminus at the lake is 580 miles. From Port Florence steamers convey passengers and goods across the lake to the towns on the northern shore : the chief of these being Entebbe, Kampala, and Jinja. The distance from Port Florence to Entebbe is 175 miles. The country traversed by the railway is very interesting. After leaving Mombasa and crossing the bridge over the Makupa creek the line ascends a steep grade which affords an excellent view of the island and glimpses of the sea : it passes through groves of cocoa-nut palms, orange and pomegranate trees, and banana plantations. Later the railway traverses the Taru desert, which is covered with scrub and small trees, the timber of which is large enough to be used as fuel for the engines. Wood is used almost exclusively for the engines, and the heaps of coal so common around big stations and junctions in Europe are here replaced by long stacks of logs, each log measuring six feet in length. In some parts of the journey the logs are obtained from the tall juniper trees, and they are as fragrant as cedar-wood.

About 280 miles from Mombasa the railways enters the Athi plain, and around Simba station lions are plentiful. The rhinoceros and giraffe are occasionally seen in this section of the line. The amount of game on the plain varies with the condition of the grass: when favourable hundreds of zebra, herds of hartebeest (kongoni) and wildebeest (gnu) will be seen. Ostriches are often "on view" walking one behind the other, apparently as self-conscious as bridesmaids walking up the aisle of a church in the wake of the bride at a fashionable wedding. These birds mingle with zebras on the grazing grounds.

Scattered about in small herds, often in close proximity to the line, this pretty gazelle will be recognised. It was discovered by Joseph Thomson in his journey through Masailand to the Victoria Nyanza (1883).

Scattered about in small herds, often in close proximity to the line, the pretty Thomson's gazelles will be recognised. These antelopes as well as Grant's gazelles mix with the herds of hartebeest and zebra.

In the distance a number of vultures are sometimes seen flying around and forming a vortex. This indicates in many instances that a lion is busy feeding, and these birds are waiting to play the part of scavengers when the beast has finished his meal and retired from the carcase. After crossing the Athi river the line runs to Nairobi, 327 miles from Mombasa.

Nairobi

This town is situated on the river of the same name, and occupies a place where formerly lions roamed and roared. In 1909 a lion walked up the principal street at eight o'clock in the evening, and a man on a bicycle ran into him, fortunately without harm.

Nairobi is the capital of the Ukamba Province. The Governor of the British East Africa Protectorate resides here, and the Commissioner of the Province. The chief office of the Uganda Railway is in this town: the locomotive and carriage workshops occupy an extensive area near the station. The railway works are worth a visit: natives may be seen working steam-hammers and riveting boilers who a year previously were running about the country naked.

The town consists of Government offices, hotels, shops, banks and houses, many of which are built mainly of corrugated iron; hence it has been facetiously named Tinville. There are some substantial stone and brick buildings, notably the Post Office, Treasury, the Roman Catholic Church and its schools. There is also an excellent hospital, and a hospitable club. Efforts are also being made to establish a comprehensive local museum for the purpose of illustrating the Ethnology,

Zoology, Botany, Geology, and the native arts of the British East Africa and Uganda Protectorates.

Nairobi is a centre for settlers. It is situated in the midst of a fertile country from which supplies of fresh fruit and vegetables are readily obtained. There is a local market for meat, fruit, and vegetables.

The surrounding country contains wild animals in profusion, and an official who lives on the outskirts of the town informed me that his wife found snakes in the garden, that he had shot a kongoni (hartebeest) in the same garden, and sometimes amused himself by shooting a zebra from the verandah.

That portion of the town lying along the river was formerly a papyrus swamp, and this beautiful rush still grows along its margins, but the land adjacent to the river is now a fertile garden where mealies, cabbages, French beans, bananas, and pomegranates flourish. Castor-oil plants, coffee trees, and Cape gooseberries grow wild. Land has risen in value and Nairobi is destined to become a big and prosperous town. The streets are lighted with electricity and electric trams will replace the jinrickshas which are now the common vehicle for the conveyance of passengers to and from the station.

We spent delightful days in Nairobi, making the acquaintance of many of the officials, all willing to relate their experiences and help us to obtain some knowledge on matters connected with the country, the natives, the animals, the birds, and the pests. In the woods there is a *Ficus* which, when fully grown, may measure six or even eight feet around the base of the trunk and attain a height of fifty or sixty feet; it throws out large branches with heavy foliage. When the head of the tree is carefully examined, the trunk of a dead tree will be seen projecting among the branches.

The natural history of the tree is this:—The outside tree is parasitic in the beginning and, like an outrunner of ivy, climbs up a well-grown tree; as the parasite

grows and climbs its stalks coalesce around the trunk of its host; in the course of a few years these originally

A tall tree in the deadly embrace of a parasitic *Ficus*.

independent stalks of the parasite will so fuse together that the exterior of the trunk appears perfectly uniform.

I examined several of these trees in various stages of growth and satisfied myself on these points. In some instances, the implicated tree seems as if surrounded by boa constrictors ; before its life is completely destroyed, the branches and leaves of the original tree may be seen mingling with those of the destroying parasite.

The most complete specimen I was able to examine stands in the grounds of the French Mission about three miles from Nairobi. The figs on these trees, though tasteless, are eaten by Masai children, pigeons, hornbills and starlings (Hinde). The Masai display reverence for this tree and occasionally propitiate it by killing a goat beneath it.

From the Sports Ground the snowy summit of Kilimanjaro is usually visible in the afternoon; and about four o'clock the beautiful snow-clad majestic peak of Kenia (17,000 feet), glorified with the colours of sunset, appears unveiled above the clouds.

After leaving Nairobi the railway climbs the slope to Kikuyu station (340 miles from Mombasa), passing through forests which shelter elephants to Escarpment station, and here reaches the edge of the famous Rift Valley at an elevation of 7,830 feet above sea-level. The train descends the ravine to Kitjabe, which marks the limit of the Ukamba Province. Kitjabe means "windy," and the place is well described by Sir Charles Eliot as "a dusty gusty station."

The view of the Rift Valley from the escarpment is inexpressibly grand, with the great mass of Longonot rising from the floor of the valley. The descent to Kitjabe station is fascinating. The line passes across numerous viaducts built at a great height above ravines. The station is half-way down the descent to the valley, and at this point the view is magnificent. Above we see the well-wooded hills; below, the slope to Lake Naivasha, and beyond is the Mau Escarpment on the opposite side of the valley. In the descent from the Kikuyu escarpment to the floor of the valley the line

descends 1,400 feet, then passes along the valley to Naivasha station (390 miles) within sight of the lake. Along this beautiful valley game of all kinds is plentiful ; antelope, zebra, ostrich, and birds of large size or beautiful plumage can be seen from the train. This part of the line is wonderful, not only from the variety and abundance of birds and animals which inhabit or visit it, but also from the weird scenery caused by the changing colour along the escarpment and around the two extinct volcanoes Longonot and Suswa. The large herds of cattle, the flocks of sheep, and of goats belonging to the pastoral Masai are additional features of interest in this extraordinary and fertile valley.

The Rift Valley in the neighbourhood of Lake Naivasha is 6,300 feet above the level of the sea ; its floor is clothed with grass and clover, with here and there a collection of small trees. The turf is much like what we are accustomed to see in England ; indeed, when covered with herds of cattle and flocks of sheep it resembles an English park, except that the cattle are humped and a few Thomson's gazelles may be seen running among the cattle.

The third section of the railway ends at Nakuru, which is a town lying under the extinct volcano Menengai, and is approximately the centre of the Rift Valley. This town is the starting point of excursions to Lake Baringo.

After leaving Nakuru the train climbs the Mau Escarpment (460 miles), where it attains an altitude of 8,300 feet. Here it leaves the Rift Valley and traverses the fertile land and the forests of large trees in the Kisumu Province. The line then descends through the Nyando Valley to Muhoroni, where the country becomes comparatively flat. The most conspicuous features in this part of the route are the enormous number of acacia trees, whose stems and branches resemble inverted umbrellas, the kigelia or sausage-tree, and huge candelabra euphorbias.

From Muhoroni the railway runs under the Nandi Escarpment and reaches Port Florence, its terminus at Kavirondo Bay, Victoria Nyanza, where a comfortable steamboat conveys passengers to Uganda.

Whilst waiting for the steamer to start we spent an interesting hour watching the fishermen on the lake shore, as well as amusing ourselves with the crowned cranes, which could be approached as easily as the fowls in a barn-yard.

Throughout the greater part of a railway journey from the coast to the Victoria Nyanza the country presents a panorama of absorbing interest. The variations in the physical conditions of the provinces traversed by the railway are remarkable. After leaving Mombasa with its heat, humidity, and fertility, the line slowly climbs a long extensive slope covered with scrub, and unsuitable for cultivation. Scrub is a term in constant use in relation to land in East Africa; it may be described as coarse grass, with stunted, thorny bushes growing among it, with trees here and there. An extensive tract covered in this way is known as the Nyika (wilderness or desert).

From the moment the train leaves the Salisbury Bridge attention is sure to be arrested by the brick-red earth. This is especially noticeable in the railway cuttings. A large part of the Protectorate is covered with a sheet of lava, which is gradually undergoing disintegration and forms a very fertile soil.

It is curious to see the huge ant-hills arising by the side of the railway, many of them ten feet high and as red as any chimney pot in rural England. Some of them present several openings and look like a cluster of chimney pots. Occasionally a tree will be found growing in the midst of an ant-hill, and here and there ant nests will be seen in trees.

Around Nairobi, and especially in the Kikuyu country, honey-barrels hang in the trees, and they form curious objects as seen from the train.

The temperature throughout the journey varies within very wide limits. It is a curious and pleasant experience to pass from the moist and stieky heat of the eoast to the dry and agreeable air of the Ukamba Provinee, but it is a surprise to wake up in the early morning on the Athi Plain, in the Kikuyu forest, or at the Mau Esearpment shivering with cold and to find the temperature at, or very little above, the freezing point.

The alterations in the physieal and atmospheric conditions in the eountries traversed by the railway is attended with eorresponding ehanges in the eharaeters of the trees, shrubs, bushes, and plants. As we leave the eoast, the tropical vegetation is gradually replaced by the priekly aeacia and the euphorbia. Around Nairobi the landseape is beautified with the ealodendron, hibiseus, salvia, ficus, and wild eoffee. The Kikuyu forests abound in junipers, wild olives, brambles, violets, elover, and bracken. Higher still eomes the serub, the prickly bush, and the aeacia. In the rains these trees are eovered with leaves, and are further beautified by the eonvolvulus and other creepers whieh invade them and burst into flower.

The tribes of men living in the distriets traversed by the railway are sure to interest travellers. The ehief of these are Wa-Kikuyu, Masai, Kavirondo, and Nandi.

In a railway journey through 580 miles of eountry it is probable that examples of all these raees will be seen. Many come down to wateh the train from sheer curiosity. Others walk along the footway by the side of the line or will be seen engaged in work, or herding eattle. Many are as interested in the white passenger as the latter is eurious about them. Some of the natives come to barter or to sell euriosities and espeeially spears.

Among the various contrivanees which civilisation has introduced into East Afriea, there is probably none which the natives find more useful than the kerosene

can ; it is greatly appreciated by them and has replaced gourds in their domestic economy.

The kerosene can is used as a bucket for drawing water from a well, or as a pail for its conveyance. When such a can is divided and a hole made in the end of either half it becomes a useful funnel. On visiting a village it is common to see these cans used as sauce-pans, baking-tins, ovens, and parrot cages ; receptacles for pombe (beer) ; useful boxes for clothes or books, and travelling trunks ; one can well-packed is a sufficient, as well as a convenient load for a porter to carry on his head, and two of them are easily adjusted as panniers for donkeys.

The kerosene can has largely replaced gourds for the conveyance of water in British East Africa.

The European settlers use the kerosene can as tubs for shrubs and as flower pots ; the edges of the cans when used for flowers are cut into triangular patterns, much in the same way as the Masai herdsmen clip the ears of their cattle. When the kerosene can is useless as a vessel for holding liquids, it is hammered out and the square sheets are useful for roofing huts.

Travelling along the Uganda Railway from Mombasa to its lake terminus at Port Florence, the tourist will see zebras, hartebeests (kongoni), wildebeests (gnus), Thomson's gazelles, Grant's gazelles, wart-hogs, and

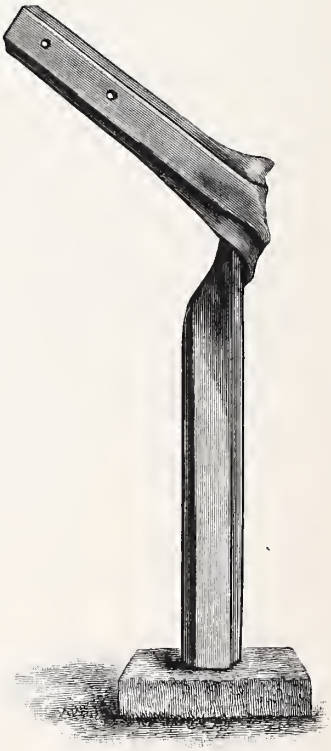
[*Photograph by F. L. Henderson.*

The Simple Life. Nandi woman and baby.

buckbuck. With good luck he may see elands, giraffe, and the rhinoceros, and, if he be exceptionally lucky, a lion in the early morning, and a hyæna in the late afternoon.

Of birds the following will interest him : ostriches, bustards, eagles, hawks, and vultures ; shrikes sit on the telegraph wires. Among others he will recognise the glossy starling, drongo, weaver birds, chats, the crowned crane, hornbill, touraco, coly, swallow, bee-eater, stork, oxpecker, and the secretary bird.

The Uganda Railway is unique of its kind, for it is probably the only railroad in the world where monkeys swing on the telegraph wires ; giraffes break the wire with their long necks in crossing the track, and the rhinoceros tilts at telegraph poles in true quixotic style. As a rule, the laugh is with the animal. On rare occasions a lion promenades the platform and interferes with business.



A T-iron (eight feet long, eight inches wide, and a quarter inch thick), used as a pedestal for a telegraph post. It was twisted by an elephant.

III

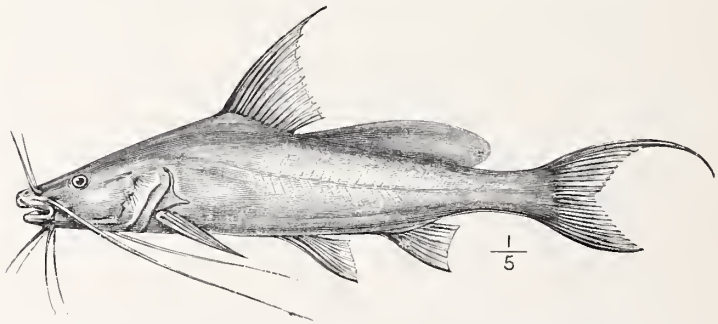
THE VICTORIA NYANZA, THE GREATEST LAKE IN AFRICA

An extraordinary fascination surrounds the history of the Victoria Nyanza. It is remarkable that a lake with a shore-line of 3,200 miles and an area of 25,000 square miles lying in the midst of a thickly populated region of East Africa should have remained undiscovered to the modern civilised world until Speke discovered it in 1858. Now the lake is daily traversed by steamers with regular ports of call, engaged in conveying passengers, tourists, and cargo as safely as on Lake Michigan.

Port Florence (Kisumu) is on the shore of Kavirondo Gulf, a nearly land-locked inlet about thirty miles long, and varying in width from two to three miles. This gulf is on the north-eastern shore of the lake, and the channel by which it communicates with the main water is almost blocked with islands. Anyone visiting the lake will appreciate the difficulties experienced by the early explorers in deciding between islands and prominent headlands, unless the parts were carefully explored: this in many instances was difficult on account of the hostility of the inhabitants.

The Nile leaves the lake at Napoleon Gulf on the northern shore. As the steamer enters this gulf and approaches the landing stage at Jinja there is nothing to lead one to suspect that the falls are so near. A prominent bluff pushes into the lake between the landing stage and the falls; in order to see the latter it is necessary to leave the steamer and walk over a low

grass-covered hill, when suddenly the Ripon Falls, or cascades of Jinja, come into view. The river at its origin divides Uganda on the west from Busoga on its east bank. Speke on his second journey (1863) saw the falls from the Uganda side; tourists are conducted to them by a well-kept pathway on the east side. As we traversed the footway, humped cattle grazed amidst a flock of buff-backed herons, busy picking ticks from the backs of oxen. On reaching the falls we found the rushing water carrying over large fish; the natives were busy securing some of them with spears. The ferry, as in Speke's time, runs across the gulf above the



Bagrus docmac. The rushing deep green waters carry large fish over the falls; the natives who haunt the coves with their spear-like harpoons secure some of them.

falls, but the crocodile and hippopotamus have retreated to the deep and silent pools a mile or so below, where the shores, thickly covered with trees, reeds, and rushes, are rendered dangerous by the dreaded tsetse-fly.

The rocks and trees in the river immediately below the falls are crowded with herons, cormorants, and egrets. One of the most conspicuous birds around the lake and head-waters of the Nile is the Vociferous Sea-Eagle. This, the handsomest of all the sea-eagles with its white head, neck, breast and tail, but chestnut belly, looks superb perched alone on the top of a high tree and sometimes on a telegraph post for hours, occasionally

uttering loud, piereing sereams. It takes little notice of man. I onee shot a bee-eater perehed on the lower branehes of a tree, when a sea-eagle in the tree-top took no notice of the noise.

In the eool of the afternoon we lingered, eharmed and faseinated by this delightful spot. When the light began to fade we stepped into a native "dug-out" above

The Screaming Sea-Eagle (*Haliaëtus vocifer*) lives around the "birthplace of the Nile."

the falls and sitting on its sides allowed ourselves to be paddled to the steamer lying in the lake.

Frogs are very numerous in the lake, espeeially near the landing stages, and after nightfall keep up a continuous eroaking and din, like the sound of maehinery in a large faetory.

There are certain phenomena connected with the lake which are worth consideration. The water of the main lake is deep blue, sweet, and good to drink, but in the bays it is dark and muddy: it varies greatly in depth, being only a few feet in the shallow bays and 280 feet in the main lake. The depth of the water also varies according to the wetness of the seasons, but independently of these changes it is asserted that the surface of the lake has been slowly sinking since 1878, as determined by markings on the cliff limiting the south shore. Many bold headlands round the coast were formerly islands, and many islands are separated from the mainland by narrow and often shallow channels. In the morning there is usually a land breeze from the south-east, and towards evening from the lake to the land. This action of the wind causes the level of the lake at Port Florence to be twelve inches higher in the afternoon than in the morning (Whitehouse).

The movements of the curious papyrus islands are associated with these breezes. Many of the bays and creeks are filled with the beautiful papyrus rush, and the Victoria Nyanza, like other large bodies of water, is occasionally subject to violent storms which lead to the formation of huge waves. These disturbances lead to the detachment of large masses of papyrus rush from the banks, and the morning land-breeze drives them into the lake, and the evening breeze brings them back to the shore. Papyrus islands are usually seen in a voyage on the lake; they form pretty objects floating about in an irresponsible manner. It is common to see a cormorant resting on such a floating island, and occasionally a crocodile. A papyrus island the size of Trafalgar Square is sometimes occupied by a flock of egrets, and has density enough, in virtue of the long submerged roots of the rushes, to support a hippopotamus. Captain Gray informed me that on one occasion, as his steamer entered Kavirondo Gulf, he found the water so crowded with these floating islands

that he had to steer the vessel with great care, and with some difficulty among them.

These rush islands are pretty objects, and serve to variegate the surface of the lake. The shallow parts of the bays are also occupied by that troublesome plant *Pistia stratiotes*, which is one of the constituents of the sudd. The important elements of the sudd are papyrus rushes, reeds, feathery grass and occasionally ambatch. These are woven together by creeping plants of the convolvulus order. Near the level of the water the stems of the reeds and rushes are cemented together by aquatic plants of which *Pistia* is the most conspicuous: it is like a lettuce and has thick, pleated, succulent leaves. The plant throws out rhizomes along the surface of the water which in their turn bud, and the buds also throw out rhizomes. On the lake, and the upper reaches of the White Nile, *Pistia* is a common object quietly floating down-stream.

The Victoria Nyanza may be regarded as a huge reservoir with one outlet, the Ripon Falls. Its chief affluent on the west is the Kagera river, and the Nzoia on the east.

This enormous lake is visited by electrical storms of extraordinary violence. I had heard a great deal about these electric displays, and had the good fortune to witness one from the deck of a steamer. The night was very dark, and the sky became illuminated by almost persistent streams of yellow and blue electric light. The effect could only be described as horrible. When the steamer occupied the vortex of the storm, it seemed as if the lightning hissed as it rushed into the water of the lake. Whilst these streams of electric fluid were coursing downwards from the sky, the clouds were suffused by broad cascades and streams of lightning resembling the aurora borealis. The instantaneous crashes of thunder following on the electric discharges resembled the detonations of huge shells or 100-ton guns. These storms are very common, and destroy the

lives of men and beasts as well as property. The boat from which we witnessed this terrible display had a piece of the mainmast detached by lightning in a previous voyage. Some of the American passengers appropriated the fragments with the intention of having them made into paper-knives as souvenirs of the storm.

A Government official who knows the lake and its vicinity well explains the frequency and the intensity of these electrical storms by the fact that the hills, especially on the north-eastern shores of the lake, contain ironstone in large quantity, and especially on the Nandi escarpment. Standing on the hills above the escarpment the storms seem to be beneath the feet of the observer, and the currents of lightning appear to strike the face of the cliffs.

The destructive force of such storms may be appreciated when one learns that thirty-two head of cattle were killed by one of these terrible flaming electric swords. These storms are accompanied by extremely heavy rain—more correctly, falling sheets of water.

In the rainy season waterspouts occur, so that a voyage on the Victoria Nyanza may be as much marred by wind, storms, and rain as a voyage on the ocean. There is another curious and also unpleasant occurrence occasionally encountered on this wonderful lake, namely mosquito clouds. One morning whilst crossing the lake in the neighbourhood of the Buvuma archipelago I noticed in several directions an appearance like clouds of smoke, and at first thought that these smoke clouds came from fires on the islands. On watching them closely and remembering that the surface of the lake is nearly four thousand feet above sea-level I thought they might be clouds. Then the columns assumed fantastic shapes and began to gyrate over the lake, condensing and attenuating. Then one large cloud, in the form of a hollow cylinder, approached, encompassed the steamer, and enveloped it in millions of gnats.

These winged clouds are known to entomologists as "dancing-swarms." On any warm summer evening in England dancing-swarms of gnats may be seen over pools, ponds, or water-butts containing stagnant water. The eggs of the mosquito are hatched in warm water, and the larval and pupal stages are passed in this medium. When the pupæ are ready to hatch they rise to the surface, emerge from the pupa-cases, dry their wings and fly away. In order to produce such enormous clouds of gnats the water of the lake must contain myriads of larvæ. The natives around the lake catch these gnats by means of grease and make them up into an oily kind of cake and eat them. Among the natives living around Lake Nyasa this preparation is known as "Kungu cake." Kungu means "mist," which the dense flights of these midges resemble.

A description of the Kungu fly by the Rev. A. E. Eaton is given in the appendix to Elton's Journals (1879). It is identified as a gnat. He also states that similar immense swarms of gnats have appeared in England, and have been mistaken at a distance for columns of smoke.

In Egypt dense flocks of pigeons in the distance are often mistaken for clouds. This is also true of locusts, dust, sand, and smoke.

A description of the Victoria Nyanza would be incomplete without some consideration of a remarkable animal, the Marsh-buck; a bird, the Jacana, or Lily-trotter; the Mud or Lung fish (*Lepidosiren*), and the most beautiful of all rushes, the Papyrus.

The first is the animal known as Speke's antelope, in honour of the distinguished traveller who discovered it on his second journey to find the source of the Nile (1863). The buck has horns spirally twisted, but they are absent in the female. Its hoofs are greatly elongated and adapted to enable the animal to walk on the submerged reeds and mud of the swamps in which it lives. The skin which covers the back of the pastern is hairless,

thick, and horny : thus further augmenting the supporting area of the foot. The marsh-buck spends most of its time in the water, standing among reeds with all but its head and horns submerged : it can take tremendous leaps and move about at a great pace.

Speke's Antelope (*Tragelaphus spekei*).
The bird in the corner is a lily-trotter (*Jacana*) with elongated claws which enable it to move quickly over the floating leaves of aquatic plants.

Speke's original specimen was caught near the lake in some high rushes. The only food it would take was the tops of the papyrus rush : although it ate and drank freely and lay down very quietly, it always charged with ferocity any person who went near it. No other

observer has seen evidence of ferocity in the marsh-buck. I have often watched one of these animals in the Zoological Gardens and never remember to have seen an animal in confinement which appeared so unhappy. This marsh-buck used to be fairly common in the swamps around Uganda and on some of the uninhabited islands of the Sesse Archipelago.

Selous, when hunting these marsh-buck on the Chobe river, a tributary of the Zambesi river, described the search for these retiring animals among such immense beds of reeds and papyrus as tantamount to looking for needles in a haystack. The natives obtain them in the following way. When the animal is approached it immerses the whole body, leaving only the nose and tips of the horns above water, trusting to be unobserved, but the natives paddle quite close and spear it.

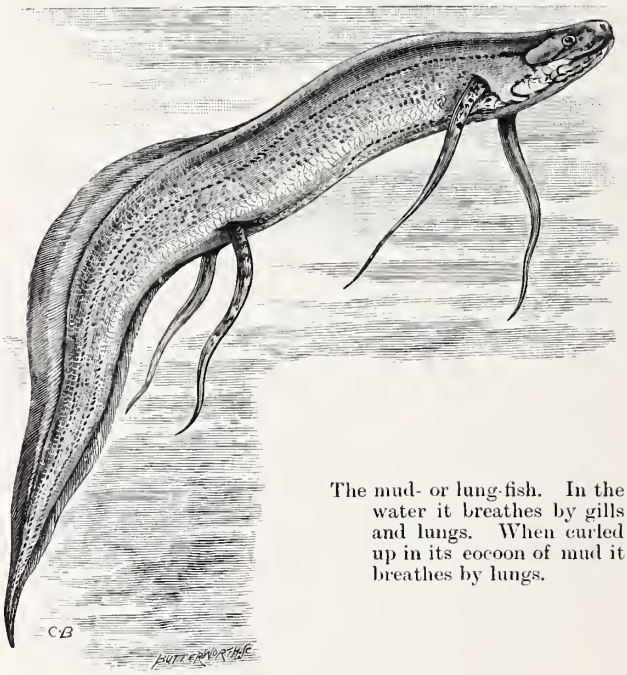
The unusual development of the hoofs of Speke's antelope induce me to mention a similar condition of the toes found in a curious bird living on the lake and often called the lily-trotter, from the dainty way in which it walks over the broad leaves of aquatic plants searching for insects.

This bird is known to ornithologists as the Jacana, and it belongs to the same order as plovers, curlews, and snipe. The lily-trotter has a body like the moor-hen and legs like a coot, but the toes and claws are enormously lengthened, and the bird spreads them out spider-like as it walks over the water-plants. The spread of the Jacana's toes has a diameter of five inches. All members of the family (Parridæ) to which the Jacana belongs frequent lakes and swamps whether inland or near the coast. When danger threatens they crouch or partially submerge themselves.

The Mud-fish.—This inhabitant of the lake is known to the zoologist as the Lepidosiren (*Protopterus æthiopicus*) or lung fish. The natives of Uganda call it mamba, and appreciate it as an article of diet.

This fish has a long cylindrical body like an eel, and

sometimes attains a length of six feet: it is remarkable in many points, and especially from the fact that it has lungs as well as gills. In the dry season the marshes in which this fish lives dry up, and to meet this change the lepidosiren makes its way into the mud to the depth of eighteen inches, and coils up at the bottom of the burrow, where it makes a sort of cocoon, or capsule,



The mud- or lung-fish. In the water it breathes by gills and lungs. When curled up in its cocoon of mud it breathes by lungs.

of hardened mucus secreted by the glands of its skin. Sequestered in this cocoon the fish breathes entirely by its lungs for half the year; in this condition the earth in which the fish is embedded may be dug up, and the ball of earth with the fish in it may be transported anywhere. When placed in warm water the lepidosiren wakes up from the long sleep and resumes the double method of breathing. In its ordinary surroundings the

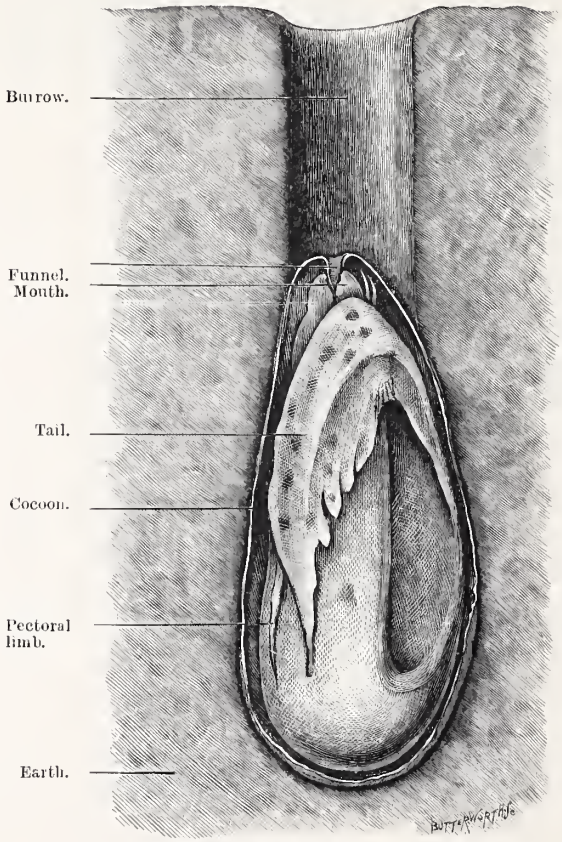
fish remains in the cocoon until the rainy season floods the marshes.

Lepidosiren is a very voracious fish: it eats frogs, worms, insects, and crustaceans, and also exhibits cannibal instincts by biting and eating its fellows. Indeed, Newton Parker, who wrote an admirable account of the mud-fish, states that it is difficult to keep these fish alive in an aquarium for any length of time owing to their habit of killing and eating one another even when supplied with an abundance of food. The bite from their scissor-like teeth causes terrible wounds. Lepidosiren has two pairs of filamentous fins, and of these the pectoral is longer than the pelvic pair, and occasionally one of these fins is bifid. Some years ago these animals were exhibited in a tank at the Zoological Gardens, and I noticed that one of the fins was bifid. The keeper told me that the deformity was due to its companion biting off the free end of the fin, and as the part grew again it became double. I am satisfied that this is a good explanation. It certainly accords with what we know of the lizard's tail, for when a lizard loses its tail and regeneration occurs, the new portion is often bifid and sometimes trifid at the tip. When the ends of tails are bitten off, the parts are regenerated but never attain their normal length. The fishermen of the lake fear the bite of the mud-fish.

Lepidosiren is a voracious fish; it often bites its companions and nips off the ends of their filamentous fins. When the fins grow again they are sometimes bifid.

When this fish burrows into the mud, the mouth of the flask-like cavity which surrounds it is closed by a lid perforated by a small aperture. The margins of this aperture are pushed inwards so as to form a funnel for insertion between the lips of the fish. Boulanger, who has written an interesting account of the mud-fish,

states that it is possible to ascertain its condition, when enveloped in the clod of earth, by passing a straw (*brin-de-paille*) down the funnel to the mouth of the fish; if alive, it immediately utters a cry which is



Lepidosiren, the mud or lung fish, in its cocoon embedded in mud. (After Newton Parker.)

produced by the expiration of air from its lungs. When the clods are softened out care must be taken that the water does not enter the funnel or the fish would be suffocated.

In West Africa the negroes search diligently for the fish in its encysted state, and they are particularly fond of it and can keep it as a provision in the clod which envelops it.

The Papyrus is a beautiful rush with a long green stem sometimes twenty feet high, which is not completely circular. The stems are crowned with tufts of delicate filaments, which were used by the ancient Egyptians to make garlands for the shrines of the gods.

A Raft made of the dried Papyrus Stems. Used by the Kavirondos on the Victoria Nyanza.

The leaves are apple-green. The pith used for making writing material by the ancient Egyptians earned for this plant the name of "paper reed," it occupies that portion of the stem which lies beneath the surface of the water. The papyrus flourishes in the swamps of Uganda, around the shallow margins of the Victoria Nyanza and in the White Nile, but it is extinct in Lower Egypt.

The thick stem of the papyrus is useful to the natives for making rafts and canoes. The Kavirondo fishermen on the Victoria Nyanza use the stems for making seines, and the leaves they weave into baskets.

The old Egyptians used the papyrus stems for making rafts, and in the wall sculptures men are represented constructing such rafts. It is probable that the little ark of bulrushes daubed with "slime and with pitch," which sheltered the infant Moses in "the flags by the river's brink" (Ex. ii. 3), was made of papyrus stalks.

IV

THE ARCHIPELAGOES AND ISLANDS OF THE VICTORIA NYANZA

The Victoria Nyanza abounds in islands; some are mere rocks sticking out of the water, and serve as basking places for crocodiles; others are of large size, thickly wooded, presenting high hills and verdant dales. Many of the islands have played an important part in the political and religious history of Uganda. Readers interested in the religious war which took place in Mwanga's reign should master the geography of the Lake Islands.[1] The most important are Ukerewe in the south; Buvuma, Bulinguge, and Kome in the north; and the Sesse Archipelago in the north-west angle of the lake. Ukerewe, twenty-five miles long with a maximum breadth of twelve miles, lies within the German sphere of interest, off the northern corner of Speke Gulf. This island is fertile; the central parts, rising to a height of 650 feet above the lake, are covered by an impenetrable primeval forest capable of supplying useful timber.

The Wa-Kerewe cultivate the soil and grow bananas, maize, sweet potatoes, sorghum, tobacco, gourds, and rice. Their domestic animals are humped oxen, goats, and sheep. They fish with weir baskets, and hook and line; and catch the hippopotamus with the harpoon.

The islanders are very superstitious and believe in evil spirits. "At the door of the hut they often hang a great iron bell, against which the head strikes in

[1] The spelling adopted is the same as that found on the map of the lake constructed by Commander Whitehouse and issued by the War Office, 1910.

opening, and which indeed is placed there for the purpose, for exil spirits are said to strike themselves against

the bell when entering the hut and are thus scared away." (Kollmann.)

Smith and O'Neill, two of the early Christian missionaries who went to Uganda (1877) in response to

Stanley's appeal were shortly afterwards murdered on this island.

Sesse was believed to be a single island until it was captured from the Roman Catholics by Major Williams (1892). After subduing Sesse Island this enterprising officer circumnavigated it, and found, instead of a large triangular island, as represented in maps, one large and many small islands, some being merely rocky islets. Their true configuration and distribution was ascertained by Macdonald (1893).

The natives of the Sesse Islands are known as Basesse. Although these islands lie in the north-west angle of the Victoria Nyanza and belong to Uganda, the people inhabiting them are more allied to the Basoga than to the Baganda.

The Basesse are not only excellent boat builders, but they are skilful paddlers and experts in manœuvring their boats on the lakes, either singly or in fleets. During the contest between Christians and Mahomedans, the Basesse declared for Mwanga against the usurper Karema, and by placing their fleet of boats at his service gave him the mastery of the lake.

Mwanga had his headquarters at these islands after his deposition in 1888. From Bulinguge (an island about one mile square in Murchison Bay) he harassed, with the help of the Christians, the Mahomedans during 1889 and could feed his force by means of the Sesse fleet. There was a time when the "Admiral of the Fleet" commanded a fleet of four hundred boats.

Mwanga and the Roman Catholics retreated to Bulinguge after the battle of Mengo (1892). This island, which the Roman Catholics regarded as impregnable, was assaulted by the Protestants under Williams, but the King escaped by means of boats to Sesse. When the Protestant attack became successful the fugitives attempted to escape from the southern shores by means of their boats. The panic-stricken crowd

tried to secure places in boats already overfull, and hundreds of them were drowned.

On the island of Bubembe, in the Sesse group, Mukasa, the great goddess of the Victoria Nyanza, had her temple, and some of the islands in this archipelago had less important gods. The priests of Mukasa had great power. It was believed that this goddess could prevent storms on the lake; make rain; draw a tooth; or kill kings. Cunningham found, in a French record, that in the year 1879 Mukasa "tied up" the lake for three months and would not allow anyone to touch its waters. At length King Mutesa was obliged to send an offering of a hundred slaves, a hundred women, a hundred cows, and a hundred goats to the temple, and Mukasa untied the lake.

Sacrifices of goats and cows were made to the goddess at her temple on Bubembe. This island is about four miles long and two wide; it is fertile, well-wooded, and picturesque. The temple has practically disappeared. This is not a matter for surprise, for such temples were merely built of mud and wood and thatched with grass. Mukasa may be regarded as the Neptune of the lake, and the priests carried a paddle as an emblem of their office. This paddle they used as a walking-stick.

Kome is eleven miles long and eight broad. The chief informed Cunningham of a curious custom which prevails on this island. If within the first year of married life a child is not born, the husband is understood to be at fault and the wife may make overtures to the husband's brother. When the intrigue is successful the husband is informed, and life assumes its normal features. The natives of this island cultivate bananas, beans, potatoes, coffee, Indian corn, and tobacco. The Sesse Archipelago forms a county of Uganda, and is represented in the Native Parliament.

The Buvuma Group consists of seven islands near the north-east corner of the lake, adjacent to the coast

of Busoga, near Napoleon Gulf. The three largest islands in this group are Buvuma, Bugaya, and Busiri.

Buvuma, the largest of these islands, is of irregular shape and seems to be made up of peninsulas. It has an area of about 170 square miles and is larger than the Isle of Wight. It contains high hills in its central parts, some of which are 500 or 600 feet above the level of the lake. The hillsides are covered with forests, and there are grassy uplands which afford excellent pasture for cattle. Until devastated by the sleeping-sickness it contained a large population in many villages which were surrounded by excellent gardens and plantations. The natives, known as Wavuma, are excellent agriculturists, growing millet, maize, sweet potatoes, and bananas: the surplus grain they stored in granaries which resemble miniature huts. They are skilful fishermen and like the Basesse build excellent boats and are extremely expert in their use, take to the water from childhood and swim admirably. They make their own cord and ropes from fibre obtained from the aloe; and manufacture their own pottery.

The Wavuma do not differ much in appearance from the Baganda, but for a century or more there existed a feud between them and the natives of Uganda. The Kings of Uganda have tried in vain to subdue the Wavuma: as they refused to accept Christianity and had been a thorn in the side of the Baganda, Mutesa resolved to subjugate the islands in 1875. At this time the relations between Uganda and Buvuma resembled those which prevailed in the time of Queen Elizabeth between the Empire of Spain and England. At this time H. M. Stanley was staying in Uganda and he has described the fighting force with which Mutesa attempted to conquer the Wavuma. It consisted of a fleet of 230 war boats, and an army estimated at 150,000 fighting men. The Wavuma had a fleet equal to the Baganda, but their warriors (slingers and spearmen) amounted to a fifth of Mutesa's force. The

Uganda fleet was hopelessly beaten by the Wavuma, and Mutesa's warriors had no opportunity of landing on the island.

For nearly twenty years after this great fight the Wavuma not only raided the adjacent coast of Usoga and carried off the Baganda women into captivity, but they carried on an intermittent slave trade with the Arabs in German territory, and blocked the short lake route between Kavirondo and Uganda. This brought them into conflict with the agents of the Imperial British East Africa Company.

Captain Williams, the company's agent in Uganda, tried by peaceful negotiations to open the lake route, but without success. This led to the expedition of 1893. Assisted by Majors Macdonald and Smith, Williams raised a force consisting of 100 Soudanese, 2,000 Baganda guns, and 3,000 spearmen, supported by two Maxims for the purpose of capturing Buvuma. The fighting men were conveyed in two boats and 250 boats. The paddlers increased his number by 5,000 men and brought the total under his command to 10,000 men.

The Baganda fleet set out from Murchison Bay, effected a landing and encamped on the island of Busiri, and a few days later it practically annihilated the fleet of the Wavuma. The great island of Buvuma was occupied after a stubborn resistance on the part of the people.

Some miles south of Buvuma is the island of Bugaya: its inhabitants were regarded as the bravest and most fearless of the Wavuma: after the conquest of Buvuma the Bagaya surrendered.

It has been mentioned already that the Wavuma refused to accept Christianity or to have it thrust upon them, but preferred their old fetish (or Lubare) worship, which consisted in attempts to appease imaginary evil spirits by offerings of food and drink placed in little grass huts built outside the village or in the depths of the forest.

Fetish huts are of two kinds. One consists of a hut constructed of dried grass surmounted by a tall spire; the offering or charm (daua) is placed within the hut.

A Fetish Hut made of Grass (Island of Buvuma). Offerings of food and drink are placed in such huts. This is the way the spirits are worshipped. These huts are placed outside villages; often in the forest.

The other kind is a hollow cone of grass shaped like an inverted funnel suspended from the bough of a tree, and overshadowing a hollow stone on the ground

containing food, drink, or charms. The Wavuma are extremely superstitious, and whilst there is good reason to believe that much of their fetish worship is harmless, in some instances it was attended with disgusting acts of cruelty. The charms placed in these little fetish huts are chiefly scraps of bark, bits of iron ore found among the meadow, bundles of banana bast, and different kinds of dried berries.

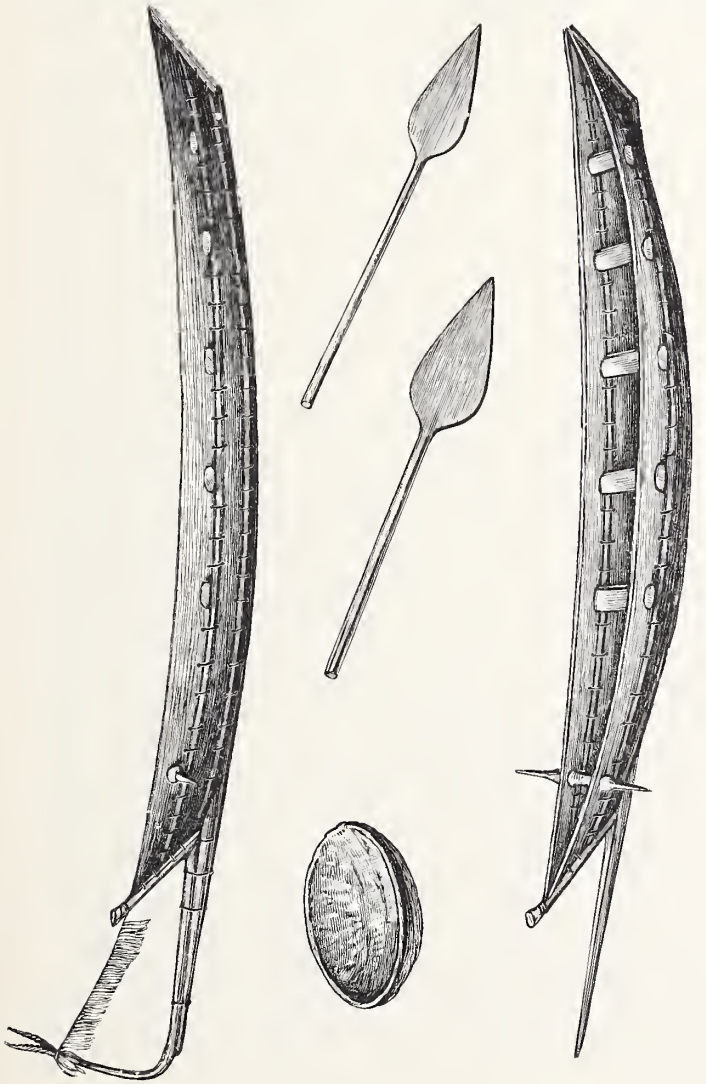
Many curious customs prevail among these people. The national dress for men is a robe made of bark cloth, but a woman's consists of a banana leaf. Cunningham points out the advantages of this simple attire: it is easily renewed, and always clean. In this respect the naked natives are angelic when compared with tribes which wear bark cloth from month to month and from year to year, without changing it. Unfortunately bark cloth cannot be washed. A woman in Buvuma must not sit on a chair; even when no men are present: she must sit on the floor.

On some of the islands (Buvuma and Busiri) the incisors are removed, and the dentist who removes them receives a fee of two kauri shells. The removal of the teeth interferes with distinct pronunciation.

The boats used by the Baganda and by the natives of the Buvuma and Sesse Islands are of great interest, for, though of peculiar construction, they have been brought to a state of perfection.

The keel of the boat is formed from a tree trunk shaped externally with a hatchet and hollowed internally, in part by burning and in part by hatchets: the keel is prolonged beyond the boat anteriorly in the form of a long sharp peak. The depth of the boat is increased by the addition of lateral planks about an inch thick. These the boat-builders hew from tree trunks: they have no saws: the planks are sewn to the tree forming the keel and to each other by means of wattle fibre, the holes for the threads being made in the planks with red, hot awls. Two tiers of planks are added to each keel-

and where these planks meet to form the bow and stern of the boat a triangular piece of wood is let in to tighten



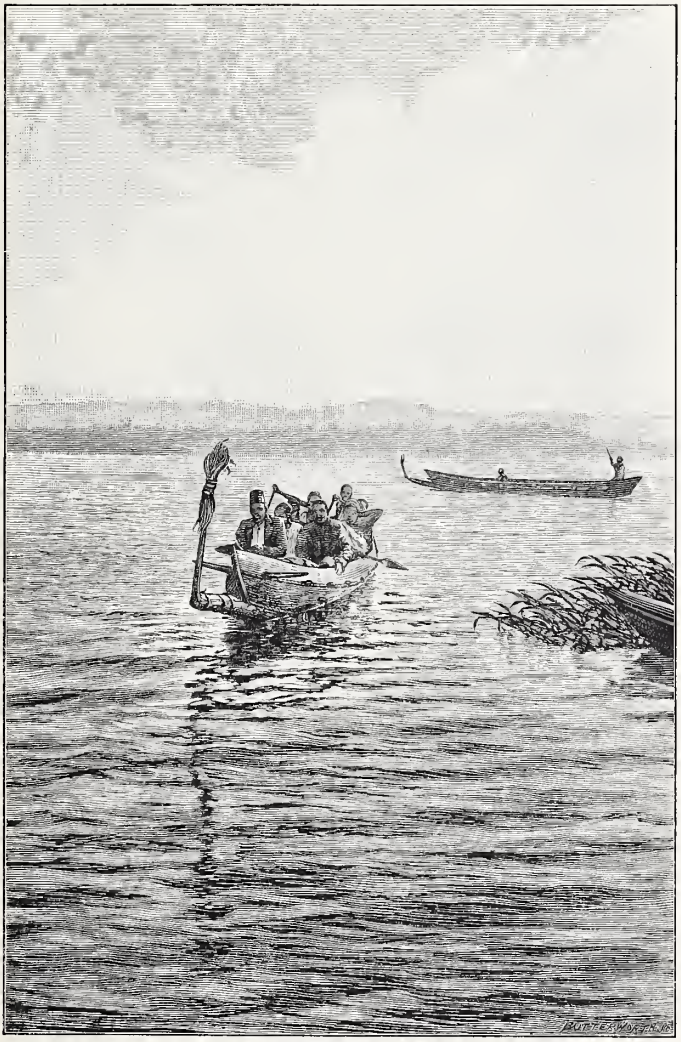
A Uganda boat with paddles and baler.

them. One plank is not long enough to extend the entire length of the boat; two or more may be needed. Where

the edges of two planks overlap a narrow strip of wood is firmly fastened to make them watertight. A strong spar traverses the sides of the boat near the prow and projects on each side beyond the planks; this serves as a handle to enable the boat to be drawn ashore. The narrow seats are fastened into the boat in a peculiar manner. When the side planks are fashioned, semi-circular notches are made in corresponding parts of the adjacent planks which receive the ends of the seats. The seat has a rounded knob at each end; this knob is received in the holes formed by the apposition of the semicircular notches in the planks and projects on the outer surface of the boat. When the seats are in position a line of knobs is seen in the line of junction formed by the union of the first and second row of planking. The seats, therefore, give firmness to the boat.

In addition to the sharp beak formed by the keel a movable prow (the prow of peace) is added, and in order to make it firm, a strong cord passes from the prow to the bow of the boat: this line is usually hung with grass or fibre cut to a convenient length. The end of the prow is often surmounted with horns. When completed the boat is usually smeared with red Uganda clay. The boat is impelled by paddles about three feet long; the paddlers sit with their backs to the steersman, who turns the vessel in any desired direction by using his single paddle like a lever on the right or left side. When the lake is calm a boat containing twenty paddlers can be impelled at a quick rate and for a long time. The paddlers sing monotonous songs as they urge their boats through the waters of the lake. It is an interesting sight to watch such a boat in motion; the rhythmic movements of the paddlers would do credit to any crew; the handles of the paddles simultaneously strike the sides of the planks and produce a loud knock. The centre of gravity lies far back in the boat, so that the fore part is well out of the water; each is provided with a baler.

Some of the boats, especially those built for war purposes, accommodate a hundred paddlers. In war-



A Sesse Boat on the Victoria Nyanza.

time the false prow is removed and its point serves for a ram.

No nails, screws, or metal of any kind is used in the construction of these boats; neither the Baganda nor the Wavuma know anything of the use of sails, or saws.

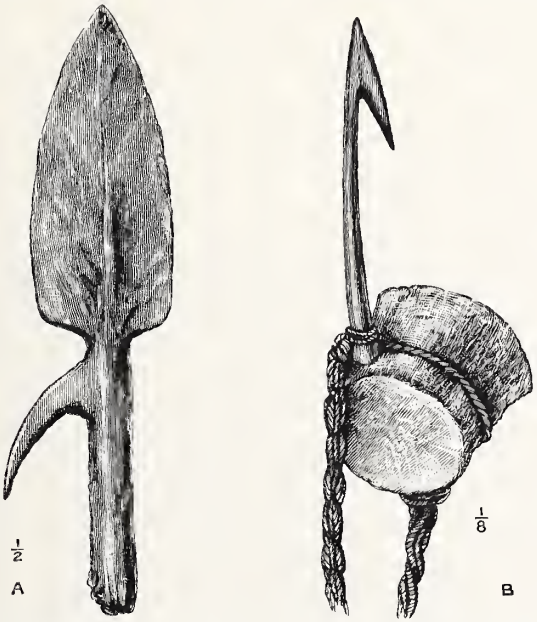
The skill and daring of the Basesse and Wavuma boatmen are proverbial. When Stanley circumnavigated the lake in 1875, he was often in peril from the Wavuma. He describes the voyage around the indented shores of Speke's Gulf and his visit to Ukerewe, where his guide had many friends. Some of the natives laughed at the novel method employed by his men in rowing, but when the sail was hoisted they fled in terror. The boat was frequently chased by hippopotamuses, and further along the coast it was pursued by war boats, blown about by severe gales, pelted by hailstones as large as filberts, and deluged with torrents of rain. The piratical craft of the Wavuma were so belligerent that one had to be sunk with bullets. When he approached Uganda he was received with a flotilla, greeted with volleys of musketry and the thunder of drums. On shore he was welcomed with flags and received in audience by Mutesa. On leaving Uganda, after a stay of many weeks, Stanley returned to his base at Speke's Gulf, and ran a narrow risk of being murdered by the inhabitants of a large island ten days' sail from Uganda.

The dwellers by the lake believed wonderful stories of the Wavuma daring in the water, and credited them with the ability of swimming under water to hostile boats, and cutting with short knives the sutures which secured the planking.

Great changes have come over these interesting Lake Islands. In 1901 the sleeping-sickness visited them and the adjacent shore districts, especially Uganda and Busoga. In 1908, Bishop Tucker, in describing the havoc wrought by this disease, stated that "the islands have been depopulated." Kome, which at one time was said to have a population of 10,000, has hardly 500 souls

left. The fishermen on the lake shores have become an extinct race. South Busoga has suffered even more than Uganda. Nanyumba's country has been more than decimated, whilst Wakoli's, formerly the very garden of Busoga, is now a "howling wilderness."

At the time of my visit (1910) the last act, so far as the islands are concerned, had been performed. The few people living on the great island of Buvuma had



Harpoons used by Natives for Catching the Hippopotamus.

A. This fragment of harpoon was found in the body of a hippopotamus shot in Rhodesia firmly encysted in the animal's subcutaneous tissue.

B. Harpoon and float as used on the Victoria Nyanza. (British Museum.)

been removed to the mainland and isolated in a sanitation camp. Similar measures had been carried out in the islands of the Sesse Archipelago. To-day there is no fishing carried on in the northern waters of the lake, and on these islands crocodiles and tsetse-flies reign supreme.

Many of the large rivers and lakes of the Ethiopian Region are inhabited by the hippopotamus. This huge pig is the largest mammal which lives in fresh water, as the sperm whale is the biggest mammal known to live in salt water. It is by no means difficult to shoot, and this form of sport is as devoid of danger as pigeon shooting. The natives endeavour to hunt the hippopotamus with the harpoon. The method appears to be this:—

The harpoon is a piece of barbed iron with a cord and wooden float attached. The line traverses a hollow handle made of bamboo several feet long. When ready for use, the harpoon is drawn up to the end of the hollow handle by means of the line attached to it. The wily native conceals himself along the track used by the hippopotamus, and as the animal passes it receives a forcible thrust which fixes the harpoon in the thick hide. The wounded beast rushes into the water, but the hollow handle is retained in the hands of the hunter, and the line runs along it; the float attached to it indicates the position of the animal, which immediately seeks refuge in deep water. The second part of the hunt is performed in the water. The hunters go out in boats, and, on finding the float, await the harpooned beast as it rises from the depths. When the hippopotamus comes to the surface and opens his enormous mouth to seize the boat and overturn it, the hunters inflict serious damage, especially on the animal's nose, with their spears. In this way, as the result of repeated attacks, the animal succumbs, and forms the material for a native debauch.

It does not necessarily follow when a hunter implants a harpoon into a hippopotamus that he secures the object of his ambition. The line may break, and the iron which enters the animal's body may fail to entail its destruction. I have had an opportunity of examining an iron harpoon, removed from the body of a hippopotamus, which had been thrust into its

hide a long period before it was shot by Mr. Long in Rhodesia. It seems as if the iron ring which held the rope had broken off. The harpoon was found deeply embedded in the subcutaneous tissues, whilst the animal was being skinned. This is an interesting specimen, because it shows that the hippopotamus is hunted with the harpoon in Central, as well as in East Africa and Uganda.

Old and Young.

The hippopotamus is a menace to the natives in their boats and canoes.

V

UGANDA

Uganda is the most northerly as well as the most powerful negro kingdom on the Victoria Nyanza. It is governed by a Kabaka (or King) assisted by a Prime Minister, a Parliament, a Chief Justice, and a Treasurer. Kampala is the headquarters of the administration.

In 1894 a British Protectorate was proclaimed over the territory of Uganda, which included only the country subject to King Mwanga: this protectorate has since been extended by the additions of territories bordering Uganda and known as Usoga, Unyoro, Ankole, Buddu, and Koko. The official capital and headquarters is Entebbe, situated on the shores of Victoria Nyanza at Murchison Bay. Entebbe, the principal port of Uganda, is in direct communication with the East Africa Protectorate by steamboats which run across the lake to Port Florence on Kavirondo Gulf.

Stanley's visit to Mutesa (1875) was fraught with important consequences, as it led to the introduction of Christianity into the country. This notorious, cruel, and bloodthirsty king, anxious to find a more satisfactory religion than fetishism and ancestor-worship, was initiated into the principles of the Christian Religion by Stanley. This was followed by the advent of missionaries, an event which led to many complications, for in religious matters Mutesa proved to be as fickle as he

was cruel. The Arabs who were settled in the country as ivory merchants had introduced Mahomedanism, and the religious question was complicated by the Roman Catholics who founded the Mission of the White Fathers. Eventually the Protestant and Roman Catholic sections of the Church found themselves, not only in rivalry, but in actual strife.

Mutesa (or M'tesa as his name is often written) died in 1884: he remained a pagan to the end in spite of the proselytising efforts of Protestants, Roman Catholics, and Mahomedans. He was succeeded by his son Mwanga, a violent and vicious man, who soon came into collision with the religious factions. For this there was some excuse, as the religious bodies were quarrelling with each other, and each trying to impose its religion on the Kabaka. Cunningham neatly expresses the position in this way:—"The Arabs dosed him with Mahomedanism, the White Fathers dosed him with Catholicity, and the English missionaries dosed him with Protestantism."

Mwanga cruelly persecuted the Christians and Mahomedans. His corrupt and vicious ways led to his deposition in 1888, and he died an exile in the Seychelles, 1893. It is a fact of some importance in connection with the religious struggles which took place in Uganda from 1884 to 1898, that the natives are not circumcised unless they become Mahomedans: they have a great dislike to this rite, and this may have had some influence in preventing the spread of Mahomedanism.

When the Mahomedans for a time obtained the upper hand in Uganda, they wished to make Kiwewa, the eldest brother of Mwanga, Kabaka, and attempted to force on him the rite of circumcision, but he refused, and killed some of the high functionaries who had come to his enclosure for the purpose of performing the rite.

The Baganda are now almost completely converted to Christianity either in its Protestant or Roman Catholic form. Some are Mahomedans. In the revengeful religious wars which took place in Uganda during the reign of Mwanga the zeal of the converted natives was similar to that of English Protestants in Mary's reign, and "it carried many Baganda to martyrdom."

The natives of Uganda are known as Baganda, but one of the race would be called Muganda; the language is known as Kiganda. It is important to keep these rules in mind. For example the islanders of Bavuma are the Wavuma, those of Sesse islands, Basesse; and the inhabitants of the great island of Ukerewe, Wakerewe. In the same way, in the East Africa Protectorate, Wakikuyu signifies the natives of Kikuyu, and the Wakamba live in the district of Ukamba.

The Baganda differ in many ways from ordinary Africans. Their faces are very black, but they have a mild and inoffensive appearance. They are clothed with garments made of bark cloth, but many native Christians, men and women, wear a long white calico garment, not unlike a nightgown, called a kansu, and wear sandals of stiff ox-hide made to fit the feet.

The Baganda live in comfortable houses built of wood and dried grass: the interior of such houses is divided into suitable apartments for the members of the families who use them. They cultivate beans, sugar-cane, sweet potatoes, coffee, and bananas; the coffee is not drunk as a decoction, but the berries are eaten.

Though possessing cattle the Baganda live mainly on bananas, which grow luxuriantly in Uganda and on fish from the lake which are caught in weir baskets. These people make earthenware vessels, pipes, spoons, musical instruments, such as guitars and especially drums, spears, shields, and various things which they

use as charms to ward off evil spirits. Necklaces and bracelets are worn in a becoming manner and these people do not circumcise, nor disfigure their bodies by keloid scars. They do not file or knock out the incisor teeth, nor work the hair into grotesque or fantastic shapes.

It is an extraordinary change to pass from the Province of Kisumu, where the Kavirondo men and women walk about more naked than our apple-loving parents in the Garden of Eden, and enter Uganda, where the natives exhibit the most scrupulous regard for outward decency. This astonished Speke, for he tells us in his account of Uganda (1863) that Mutesa inflicted a heavy fine on courtiers who exposed their legs in his presence, but he was not so particular in regard to women. His valets were young women who used to walk about the palace naked like the Kavirondo girls. When Speke entered Uganda his donkey was regarded as indecent without trousers.

It is noteworthy that a negro people so punctilious in outward decency especially in regard to clothes, and strictly covering the body from neck to ankle, should be considered among the most immoral of the African races. The word Baganda is almost synonymous with sensuality, debauchery, and drunkenness. In Uganda, syphilis is almost universal. This terrible opinion is supported by reliable medical men and the testimony of bishops.

Sir Harry Johnston states on the authority of Monsigneur Streicher that in Mutesa's reign the population of the Kingdom of Uganda approached 4,000,000. In 1901 it was estimated at little more than 1,000,000. This decrease is partly due to the massacres which took place between 1860 and 1898, especially under Mutesa and Mwanga.

Human life had little value in Mutesa's court. Speke gave this Kabaka some firearms and at his request shot

four cows with a revolving pistol. Mutesa then handed a carbine full-cock to a page and told him to shoot a man in the outer court. On the return of the page he asked, "Did you do it well?" "Oh yes, capitally," said the boy.

Infant mortality is very great among the natives—it is rare to find a woman with more than one child: they have little love for their children. The Baganda learn arithmetic with great facility; a lady missionary was very proud that one woman in her class had shown exceptional ability and could work out vulgar fractions. The missionary then stated that this woman had a sick child, and as it showed no signs of improving, and as nursing interfered with her arithmetic, she left the little child in the forest at night for the hyænas.

Uganda is not much troubled with lions, but leopards are often a nuisance. Shortly before our visit, some of the villages had been worried by a man-eating leopard. A native party was organised to kill this animal. Nine of the party were badly mauled by the leopard and four of them subsequently died from their wounds.

Leopards are sometimes very bold, and have been known to seize and make off with patients in the sleeping-sickness camps. A Government official was having a *shauri* with a party of natives in Nandi: they were sitting round an ant-hill when suddenly a hare chased by a leopard appeared and dodged about among the men. A timely and well-placed bullet cut short his career.

All who have visited Uganda are unanimous in regard to the fertility of the soil. The valleys are moist with frequent showers which render them extremely favourable for the cultivation of bananas. The mists and rains which are so beneficial are probably due to the regular south wind which blows across the lake and carries the watery vapour with it, to fall on the verdant hills along its northern shores. The amount of watery

vapour which arises from the lake by evaporation must be enormous, especially when we remember that the lake has a superficial area of 27,500 square miles lying under the equator.

The Banana (*Musa*). A. The flower cone.
A banana plantation is as typical of Uganda as a wheat-field is of England and a potato-field of Ireland.

As Uganda enjoys an abundant rainfall it is easy to understand that the valleys between the hills may be luxuriant forests, marshes, or papyrus swamps with millions of gnats.

The Banana (*Musa*), a gigantic herbaceous plant, common in the tropical parts of the East, is cultivated in all tropical and subtropical countries. It grows wild in Uganda, but among the cultivated plants it is estimated that there are more than thirty varieties. A banana plantation is as typical of Uganda as a wheat-field is of an English county, or a potato-field of Ireland.

The banana is a curious plant: it forms a spurious stem by the sheathing bases of the leaves. Such a stem may rise fifteen or twenty feet in height. Some of the leaves are ten feet in length and two feet across the blade. These large fan-like leaves are often of a delicate green and move with every breath of wind; indeed a banana plantation is a feast of colour.

The banana is propagated by young shoots which arise from its roots. The old stem dies down after flowering and fruiting, and a new stem from the old root takes its place. The flower is of interest, for it consists of a conical bulb of purple spathes. The poorly developed petals and reproductive parts are covered by a huge purple spathe which surmounts the stalk. When the fruit forms, the stalk becomes top-heavy and doubles on itself.

Dr. Cook found these spathes very useful. The Baganda love physic, but it was difficult to persuade the patients at the Missionary Hospital to take the stuff in definite quantities at regular hours; they preferred to drink it wholesale. Graduated medicine glasses could not be supplied, but the deficiency is not felt because the spathe of a banana is shaped like a spoon, and its concavity holds for practical purposes one ounce of fluid, and thus fulfils the function of a medicine glass.

When a native goes out in the rain he takes off his clothes, carries them under his arm and uses a banana leaf as an umbrella. Bark cloth, as clothing, is soon ruined by rain. Women sometimes wrap a baby in a

banana leaf. Good fibre is obtained from these leaves, for ropemaking. The fruit of the banana after fer-

Muganda with two Banana Leaves.

mentation furnishes a sweet and intoxicating beer. When, in consequence of drought, the banana crop fails, the Baganda are reduced to a state of famine.

Dried banana leaves are emblems of mourning. When King Mutesa died the whole country went into mourning, and everyone allowed the hair to grow. (Ashe.)

Boy Collecting Termites.

In Uganda, as in other parts of Africa, termites (in their winged stage) are regarded as delicacies.

Men were clothed in the national costume of bark cloth, knotted over the right shoulder, but girded as a sign of mourning with withered banana leaves, emblems of decay and death.

The sweet potato is cultivated everywhere in East Africa from Zanzibar to Egypt (Grant). The tubers are favourite food with the natives. Guinea fowls and

antelopes are destructive to it. The plant once in the ground seems to be allowed to propagate itself without replanting from season to season.

Locusts are eaten after the wings have been removed and the bodies roasted. Termites (white ants) are regarded in Uganda as in other parts of Africa as delicacies.

In Uganda the people are divided into clans, and each clan is named after an animal, insect, fish, or

The Scaly Ant-eater, or Manis (*Manis tricuspis*).

plant. Thus, a clan is named after a sheep, grasshopper, crocodile, hippopotamus, serval cat, bean, mushroom, dog, &c. There is some reason for the choice of a particular animal or plant as the badge, totem, or sign of a clan, but its precise significance is ill-understood. No member of a clan may eat the

animal or vegetable which is the totem or sign of that clan. For instance, the mud-fish (mamba) is the sign of the Mamba clan, but no member of that clan will eat, injure, or willingly destroy this fish.

The Baganda make their own pottery. There are several varieties of clay, red, kaolin or white, and black. The blackness of the vessels made from black clay is intensified by a glaze made from graphite which occurs in Uganda. Some of the pottery is artistic, and good examples of vases glazed with plumbago may be seen in the British Museum. They also weave baskets and mats, and are skilful in utilising the various long grasses which grow in the marshes. The thatchers are a separate guild. They are especially clever in covering the outer walls of porches and the woodwork of verandahs with the long polished stalks of elephant grass packed closely together in an upright position and bound with string.

It is a remarkable fact that the Baganda, the foremost negro race in Africa, have no knowledge of the plough, the saw, sails, or of wheeled vehicles; neither have they done anything to tame or domesticate animals, but they are fond of dogs.

A curious kind of ant-eater known as the Manis is found in Uganda. From head to tail it is covered with scales, so that this animal has the appearance of a huge fir-cone, and like a hedge-hog it can roll itself up like a ball and expose a hard smooth surface to its enemies. It is said that the Manis can contract its scales on its body, so that if a monkey's finger or a dog's nose is placed beneath a scale either would be badly nipped. This animal lives entirely on ants and termites: it has a tubular mouth, a long tongue, and no teeth. The walls of the stomach are much thickened, and like birds it swallows small pebbles to assist in grinding its food. The Manis lives on trees; sometimes when climbing a tree it may descry an enemy, it will then fling its body backwards and remain immobile, with its tail firmly

pressed against the tree trunk. In this attitude the animal resembles the trunk end of a broken branch. The animal is represented in this position in the excellent stuffed group representing scaly ant-eaters or Pangolins in the Natural History Museum, London.

A Fetish Hut or Spirit-shelter.
At night the piece of pottery serves for a door.

VI

KAMPALA (MENGO), THE NATIVE CAPITAL OF UGANDA

KAMPALA is a picturesque town about twenty-three miles from Entebbe and seven miles from Port Kampala (Munyonyo) on the Victoria Nyanza. The town occupies the summits of seven hills, and has been called in consequence, by the missionaries, Zion. The names of the seven hills are: Mengo, Mutesa, Rubaga, Nasambya, Kasubi, Nakasero, and Namirembe. Each hill is the headquarters of a separate community.

Mengo is occupied by the residence of the Kabaka (King), his court and followers. Three of the hills are occupied by religious communities. Rubago has on its summit the Roman Catholic Mission, known as the White Fathers (French). Nasambaya is occupied by the buildings of the English Roman Catholic Mission (St. Joseph's). Namirembe, "the hill of peace," the highest of the seven, has the schools and the admirable native hospital belonging to the Church Missionary Society. At the time of our visit it was surmounted by the Uganda Cathedral. This remarkable edifice was struck by lightning and destroyed, September 1910. Nakasero is devoted to military and civil officials.

We approached Kampala from Entebbe travelling in a transport motor-car along an excellent road twenty-three miles long. The journey was particularly interesting; the earth was of the same brick-red material as has already been described in connection with the railway journey from Mombasa, and tall ant-hills were very frequent in the plantations bordering the roadway.

In the cultivated patches by the side of the road sweet potatoes were growing, and in several places young rubber trees had been planted and appeared to be

An Ant-hill in Uganda.
It is surrounded by tobacco plants.

flourishing. In many parts of the journey the road was bordered by banana plantations; the huge green leaves of the bananas were waving like fans in the breeze; groves filled with palms and bordered with tall

tufts of elephant grass made us fancy that we were passing through the Palm house at Kew. Suddenly the road traversed a stretch of equatorial forest filled with large trees, in all stages of growth and decay, supporting parasitic trailing plants and lianas. Some of the trees thoroughly invested by thin, pendant, trailing plants resembled a confirmation girl in nun's veiling.

These thick groves and corners of forests contain a great variety of birds, and as they flew from one grove to another I was able to recognise some of them. Not the least remarkable were the huge black and white hornbills; these birds seemed to think it a hardship that they should be expected to fly. The bee-eaters, sun-birds, parrots, and rollers filled the scene with life, glory, and beauty. In some of the forest patches monkeys are seen in troops, especially the colobus, playing among the trees or sunning themselves in the tops of dead trees, or sliding down the lianas and landolphias like children in a gymnasium.

As we emerged from the forest, palms, bananas, sweet potatoes, and rubber trees again came into view with native huts built of mud and thatched with grass: black-skinned children gnawing at bananas or a piece of sugar-cane watched the passage of the car. We rode up and down the hills of this switchback road until we caught a glimpse of the Uganda Cathedral on the top of Namirembe hill, and in a short time we entered Kampala. It was a beautiful approach to a remarkable town.

When we visit Rome with its almost continuous lines of houses and well-kept streets we do not notice the inconvenience of ascending and descending the slopes of one or other of its seven hills, when we pass from part of the town to another. In Kampala the isolation of the various institutions from one another in consequence of being perched on a hill is inconvenient, especially as the only means of conveyance is the

jinricksha. The districts around the bases of the hills of Kampala are occupied with plantations, and the residences of the white officials are surrounded with ample gardens, or compounds, filled with tropical trees, flowers, and fruits. In walking among these gardens I started a female bushbuck eating cabbages in the kitchen garden; in another two crowned cranes were performing the dance for which they are so celebrated; I also started a heron, and in the verandah there was a pretty serval cat chained up by the collar like a dog, quite tame, eager and willing to receive caresses. Our hostess, Mrs. Baker, had a young genet as a pet, and a chameleon. Genet kittens are very pretty and great favourites with men and women. While we amused ourselves in catching flies for the chameleon an interesting question arose concerning its mode of reproduction. I maintained that the chameleon laid eggs, and was immediately faced with the following statement:— A lady friend made her a present of a chameleon, which was at once placed on the wire-work blind in the lower half of the window; an hour later, three young, clay-coloured chameleons were clinging to the wire blind and there were no signs of eggs or shells. There is no real difficulty, for one species *C. pumilus* is viviparous, and this proved to be the species under discussion. It is noteworthy that the young chameleons were active very quickly after birth, and one of them caught a fly within the first three hours.

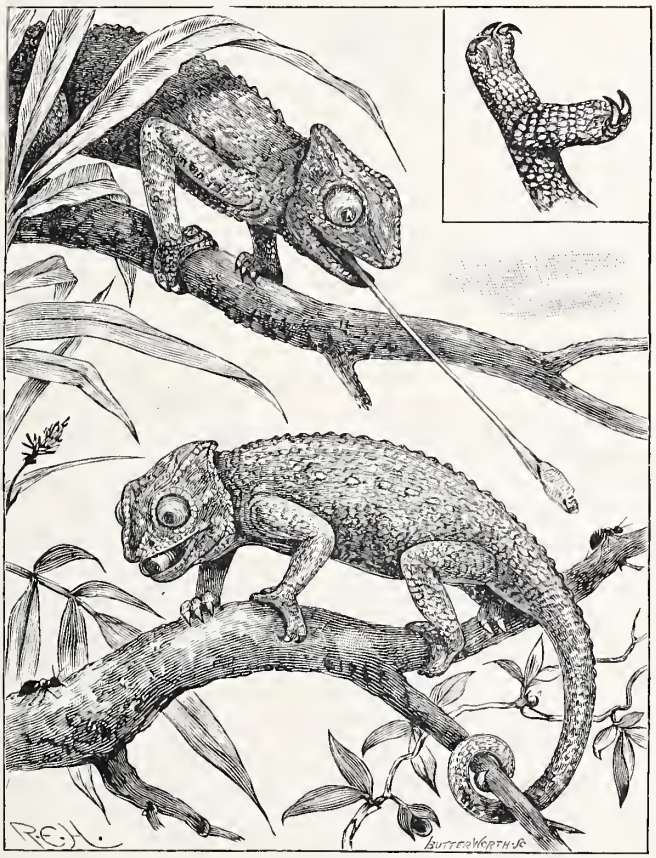
We often amused ourselves with finding chameleons and attempting to photograph the tongue when ejected at a fly. The protrusion of this long elastic organ is a deliberate and, on the whole, a slow action. When the process is watched it is easy to see when a chameleon intends to secure a fly; whilst it is carefully focussing the insect, its cheeks swell out and the end of the tongue protrudes slightly from the mouth and is then quickly ejected at the fly, and, if the insect be secured, the tongue is quickly and easily drawn back into the mouth.

Flies are often secured when held six inches from the chameleon's mouth ; it seems to aim at the fly with much more certainty at six inches than at four. Anyone who has carefully watched chameleons will agree with Gadow that the tongue works best when shot out with full force. When a chameleon ejects its tongue at a fly and misses it, the reptile appears to have more difficulty in withdrawing the organ into the mouth than when the fly is hit and secured. When the object is missed the tongue hangs about like the loose end of a rope. Protusion and retraction of the tongue, even when performed vigorously, are actions sufficiently deliberate to permit a photograph to be obtained of the act. The chameleon even in its own natural surroundings occasionally misses a fly although the tongue may be aimed with apparent care.

The variation in the colour of the chameleon's skin was another source of interest to us. Although the movements of a chameleon seem very slow when carefully watched yet left to itself for a few minutes the reptile generally escaped, and its power of altering the colour of its skin to the environment soon taught us the hopelessness of even a rigorous search. It is difficult to detect chameleons among the branches of trees unless the reptiles move. The skin of the chameleon is covered with granules.

These reptiles can hold very tightly by means of their awkward-looking feet " with triple claw disjoined." They are also aided in maintaining a secure position by means of their tails. The following observation related by Selous bears on this fact :—he saw a small owl sitting on a bare patch of ground under a thorn tree. The bird did not move until he was quite close to it. The owl flew two or three yards and something could be seen attached to its leg. He caught the owl and found that a large chameleon had attached itself to the bird's leg by twisting its tail round it two or three times.

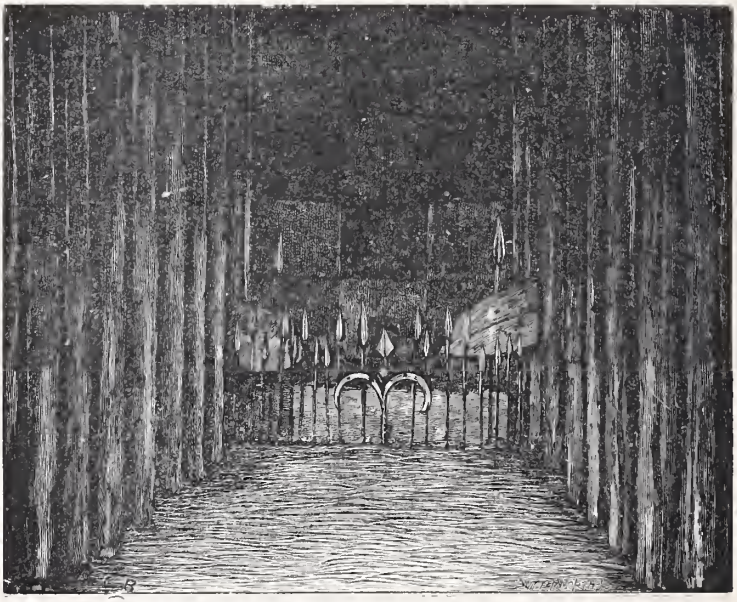
The eyes of chameleons are curious, for each can act independently of the other; one can be directed forwards whilst its fellow is looking backwards. The prominent eye is covered with a circular lid pierced by a small hole.



Stranger animal,
Sure never lived beneath the sun;
A lizard's body lean and long,
A fish's head, a serpent's tongue.
Its foot with triple claw disjoined;
And what a length of tail behind.
— *James Merrick*, 1720–69.

It is worth remembering that according to Mosaic law chameleons are included among the creeping things

Mutesa's Tomb.



Mutesa's Grave "behind the fence of spears."
(From Bishop Tucker's *Eighteen Years in Uganda.*)

unclean and therefore uneatable. They are classed with the weasel, ferret, mouse, tortoise, snail, lizard, and mole (Lev. xi. 29, 30).

The Tomb of Mutesa.—This conspicuous building surmounts one of the hills of Kampala. It is cone-shaped, built of timber and reeds, and thickly thatched with grass. It has one door and no windows, so that the interior of the tomb is weird and mysterious. Two rows of poles make a sort of aisle which is strewn with grass, and a fence of spears protects the grave, which is covered with bark cloth. There is a Uganda shield at each end of the row of spears. A large sheet of bark cloth consisting of white and dark squares arranged in chequer or draught board pattern forms the background of this sombre chamber of the dead.

In connection with the tomb a complete household is maintained as though the Kabaka was alive. These keep a perpetual vigil in the deep shadows of the tomb and are not allowed to come out.

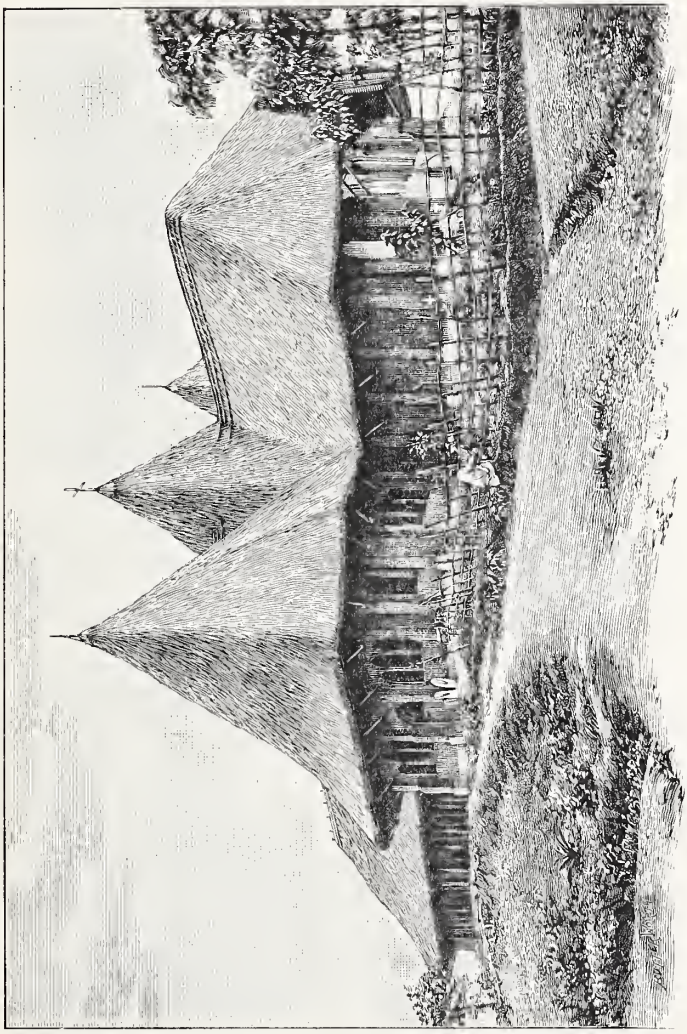
In savage Africa monuments to powerful chiefs are rare. Among most tribes death means annihilation and a man is forgotten unless he has children. It is, however, a curious fact that the names of tyrants go down to posterity more surely, and leave a more vivid impression, than rulers famous for good deeds. Herod's dreadful Massacre of the Innocents is known to a multitude of men and women, whereas few know much of the good qualities of the Emperor Hadrian. All visitors to Paris are reminded, in many districts of that famous and artistic city, of the destructive ability of Napoleon Bonaparte. Tourists in Moscow are not allowed to forget the atrocities of Ivan the Terrible. In Kampala the name of Mutesa survives though in the main it is a byword for cruelties and atrocities of the vilest kind which earned for him the title "causer of tears." Most writers on Uganda, in referring to the cruelties of Mutesa and his successor Mwanga, state that the details are too harrowing to publish. Severe

bodily punishments were inflicted on frivolous pretexts. Cunningham refers to a poor wretch he had seen, whose ears had been cut off because his goat, in passing along a path, nibbled a blade of grass on the King's land. The present Katikiro or Prime Minister of Uganda wrote an account of the Kings (Bakabaka) of Uganda; he states that at frequent intervals Mutesa proclaimed sacrifices, and the royal harem was rifled for victims, who were duly slaughtered, with many others. When Mutesa died the whole country mourned for him, a King whose conduct was so atrocious as to excite horror in a country like Africa where "Eye for eye, tooth for tooth, hand for hand, foot for foot" does not excite astonishment. For instance, when Livingstone visited the native ruler of Lunda in 1867, he found the court of the palace decorated with men's skulls, and a great portion of the people had cropped ears and lopped-off arms, which served to remind the subjects of these mutilations that the ruler had been obliged to give expression to his disapproval of their conduct. (Brode.)

The Uganda Cathedral

It has been mentioned that the most conspicuous edifice in Kampala, the Cathedral on the summit of Namirembe hill, was struck by lightning and reduced to ashes a few months after our visit. Probably no other place of Christian worship in the world was like unto it. This cathedral rested on a foundation of burnt bricks, but those used in the construction of the walls were sun-dried. The wooden roof was supported by two rows of octagonal columns built of unburnt bricks, and thatched with dried grass. The beams which supported the roof were overlaid with polished stalks of elephant grass which caused the interior of the cathedral to be filled with a pale yellow light, producing an unusual and pleasant impression.

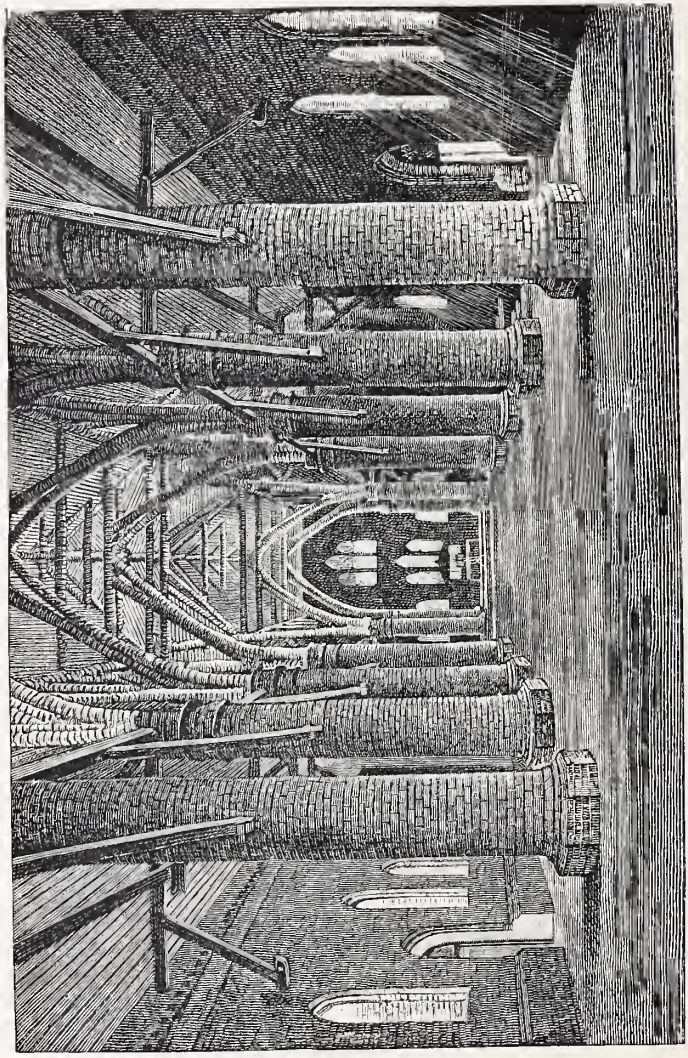
The walls were pierced with long narrow windows with wire netting instead of glass to exclude bats.



The Thatched Cathedral. (From a Photo by C. W. Hattersley.)

The netting became a necessity because the bats hung from the roof in crowds, and a dead one occasionally

fell on the native worshippers squatting on the cemented floor.



Interior of the Uganda Cathedral.

The interior of the cathedral consisted of a nave and two side aisles, a chancel, transept and vestibule. There

were two entrances, one at each end of the transept. This cathedral accommodated four thousand persons. It had neither belfry nor bell-tower, but a drummery

St. Paul's Cathedral, Uganda, had no belfry. The worshippers were reminded of their duty by drums. The drummery is a detached building constructed of wood and dried grass.

—a detached building constructed mainly of grass—containing three drums: a major, minor, and minimus; these were beaten to summon the Baganda to the services instead of bells.

The gateway of the cathedral precincts is constructed of sun-dried bricks roofed with elephant grass, and the columns supporting the corners of the roof are the untrimmed stems of palm trees.

This unique cathedral was designed by Mr. Borup to replace the older building, which was in an unsafe condition. The new cathedral, built by native labour, was begun in 1901. The Kabaka laid the foundation stone (June 18, 1901), and it was consecrated June 21, 1904. The interest evinced by the Baganda in its construction was great and practical. The members of the congregation carried the clay up the hill from the swamps to the brickmakers, and women gathered

The raven which Bishop Hannington taught to tell the people of Hurstpierpoint to "go and sign the pledge." This bird survived its preceptor seventeen years in the care of Dr. Hawken.

the wood and material required for burning the bricks. The beams were conveyed from long distances by men. Occasionally the Katikiro (Prime Minister) would join the procession and carry a load of clay. (Tucker.)

A plot of ground immediately under the shadow of the apse of the cathedral is reserved as a burying ground. It contains the remains of Bishop Hannington, who was murdered by the natives in 1885 at or near Lubu in Usogo by the orders of the superstitious Mwanga.

After the murder the bishop's body was interred near the scene of the massacre at Mumias; it was recovered by Bishop Tucker during his second journey to Uganda

in 1892, and re-interred with great solemnity at Kampala. Mwanga, who was responsible for the murder, attended the second burial, December 31, 1902.

Captain Raymond Portal is also buried here, and the officers Thruston, Wilson, and Scott, who were murdered by the Soudanese mutineers in cold blood, 1897.

The view from the summit of the hill on which the cathedral stands is very fine. From the west end may be seen the tomb of Mutesa, and the hill on which Stanley was encamped in 1875. The pathway, or track, leading from Stanley's camping ground to Mutesa's residence is pointed out to visitors.

The road leading from the cathedral passes the large native hospital in which Drs. J. H. Cook and A. R. Cook carry out their admirable medical work among the Baganda. The institution is fitted with most of the requirements of modern surgery. The organisation of the place is excellent, and testifies to the zeal and energy of the capable staff connected with it.

A short distance from the hospital is the native market, and we were greatly amused with the quaint things offered for sale. Dried fish from the lake resembling sprats; pieces of the paunch of a sheep carefully folded up with a small piece of soft fat. It was a matter of surprise to see kaurie shells in heaps, but whether as a means of exchange, or on sale for ornamental purposes, I could not ascertain. Metallic ornaments for native use were abundant and betrayed their Western origin, for some were made in Birmingham and others came from Germany.

In the middle of the market-place we found a boy busily engaged in removing "jiggers" from the sole of an old man with a safety pin. The native boys are very expert in extracting these pests.

Here we had excellent opportunities for studying bark-cloth, for the manufacture of this material is quite an art in Uganda. The bark is obtained from a species

of fig tree which flourishes in this fertile country. The bast on the inner side of the bark is removed in strips six or ten feet in length. Red bast is preferred. The strip, which varies in width according to the circumference of the tree, is soaked in water until it is a soft mass; it is then beaten with a wooden mallet to uniform thickness and dried. The strips are sewn together with extreme neatness to any desired size. The bark-cloth is often variegated by bold stencilled designs, sometimes in grotesque patterns, by means of a black dye.

It is the correct thing in Uganda for princesses and the wives of the chiefs to wear bark-cloth in preference to calico. Bark-cloth makes a useful material for binding writing books and blotters.

Whilst at Kampala we had an opportunity of visiting H.H. the Kabaka, a youth of fourteen years, the son of Mwanga by a Protestant wife. He was born August 1, 1896, and christened Daudi (David). The Kabaka is a well-grown and dignified youth, somewhat shy, but has a pleasant face and answers questions without reserve; he is fond of dogs, mechanical toys, bicycles, and motor cars. Mr. Sturrock, the clever tutor, informed me that the Kabaka is fond of reading, especially historical books and those relating to animals. Kipling's *Jungle Book* has for him a peculiar fascination. The signature appended shows that he writes English characters as neatly as any boy of a corresponding age in a public school.

H.H. the Kabaka of Uganda receives from the British Government £800 yearly, and on attaining majority this will be increased to £1,500, and he will be entitled to a salute of guns. He became Kabaka, August 14, 1897, under a regency.

Facsimile of the autograph of the Kabaka of Uganda.

VII

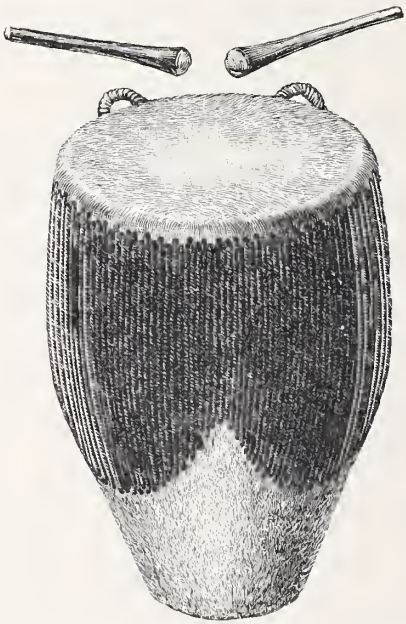
DRUMS

No account of a visit to East Africa, and particularly Uganda, would be complete without some reference to drums. In Uganda a musical band sometimes consists entirely of drums. They take the place of church bells in European cities, and, like bells, they are used for ceremonial purposes on such occasions as weddings, funerals, and religious services; at times of national rejoicing, as well as to sound alarms. In the Sesse Archipelago they are used for signalling purposes between the islands: a special drum is beaten on Kome to announce the birth of twins, and a select drum is used on the appearance of the new moon. Drums were introduced into the British army in the sixteenth century, and used for giving signals in times of peace and war.

The principle underlying the construction of a drum is the same in all countries, and in all ages. A drum is composed of a cylinder which may be of wood, bamboo, or metal, covered at each end with vellum, parchment, or prepared skin, the tension of which is regulated by strings. The sound is produced by percussion, usually by beating on the parchment or skin-covered ends with appropriate drum-sticks, or by means of the fingers or the palm. Much ingenuity is shown in making drums, and great skill is often displayed in percussing them.

There is great variety in the shape and size of drums. The Uganda drum consists of a hollow truncated cone

of wood with a piece of ox-hide stretched over its ends. These two pieces of hide are connected by cords made from banana fibre, which serve to keep them tense. The disposition of the cords produces a decorative effect enhanced by staining. Some of the drums are of enormous size. I have seen one a yard and a half



The Uganda drum consists of a hollow, truncated cone of wood with a piece of ox-hide stretched over each end. The pieces of hide are connected by cords made from banana fibre which keep them tense. The cords are sometimes stained to produce a decorative effect.

high and nearly a yard in width at the broad end. The conical-shaped drum stands on its narrow end and is beaten on the broad end. Large war drums are held extremely sacred, and the loss of one is as much taken to heart by an African Sultan as the loss of a flag by ourselves.

When Speke visited King Rumanika at Karague, he found thirty-five drums ranged on the ground, with as many drummers ranged behind them. The thirty-five drums all struck up together in very good harmony; and when their deafening noise was over, a smaller band of hand-drums and reed instruments was ordered in to amuse him.

Women Drummers at Suna's Tomb.
(After Hattersley. The Baganda at Home.)

In Uganda the State organisation is of a high order; every principal chief has his own standard and drum call. When the King's war-drum sounds the call to arms in Mengo, each district passes the signal on. Thus the country is quickly aroused. Special beats of the drum are used for alarms, as when a wild animal, such as a lion, is discovered in a village.

In Kampala, I was much impressed by the way sound travels from one hill-top to another. A native on the summit of one hill can converse without much difficulty with a native on a neighbouring hill, and in the calm of the evening the sound of the drum travels long distances. This makes it easy to believe that drums are used in these countries not only for issuing signals, but for conveying messages in code.

In Uganda the drum is an appanage of royalty, alive or dead. Women drummers live in the tombs of the kings. The tomb of Suna, the father of Mutesa, contains some of his memorials, and the old women (his widows) live in the tomb and believe that so long as a certain part of him (umbilical cord) exists, the old lord and master is with them in spirit. When this relic is brought out all the old drummers and singers beat their drums and sing old chants, just as they used to do to welcome the approach of their master during his reign. (C. W. Hattersley.)

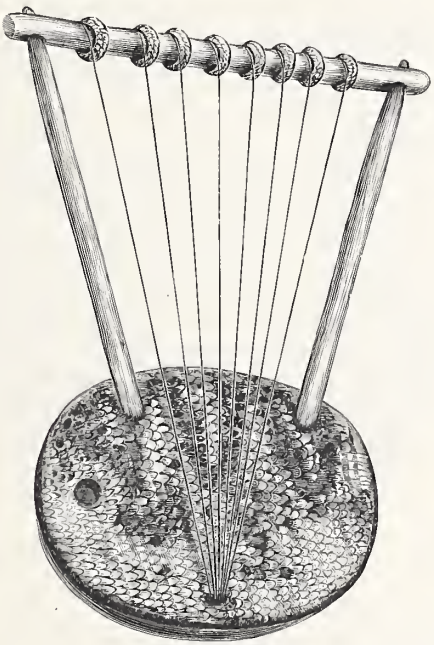
Simple forms of drums are made by hollowing out a piece of the stem of a tree, a yard long and eight or nine inches in diameter: over the ends of these long cylinders a piece of skin from a large lizard is stretched: sometimes a piece of goat or antelope skin is used, but whatever the material, it is fastened over the end of the drum and fixed to the wooden cylinder with pegs, or in some of the more elaborate drums, the skin is kept stretched by means of strips of leather.

Long narrow drums of this kind are carried by means of a leather strap passing over one shoulder of the drummer. The drums are beaten by means of wooden sticks, or the end of the drum-stick is enveloped with bast or rags.

The most complicated drum I have seen was shown me by Mr. Hobley, who obtained it from the Wa-Kamba. The drum-cylinder was from the stem of a large bamboo; it measured two yards in length and six inches in diameter. At one end of the cylinder a piece

of wood is left as a handle : the opposite end is covered with, hide which is drawn into a cone by means of a piece of stout brass wire passing upwards through the hollow of the drum : near the handle this piece of wire is strained over a bridge of wood like a violin string and made taut on the outside, near the handle.

In order to play the drum, it is held by the handle

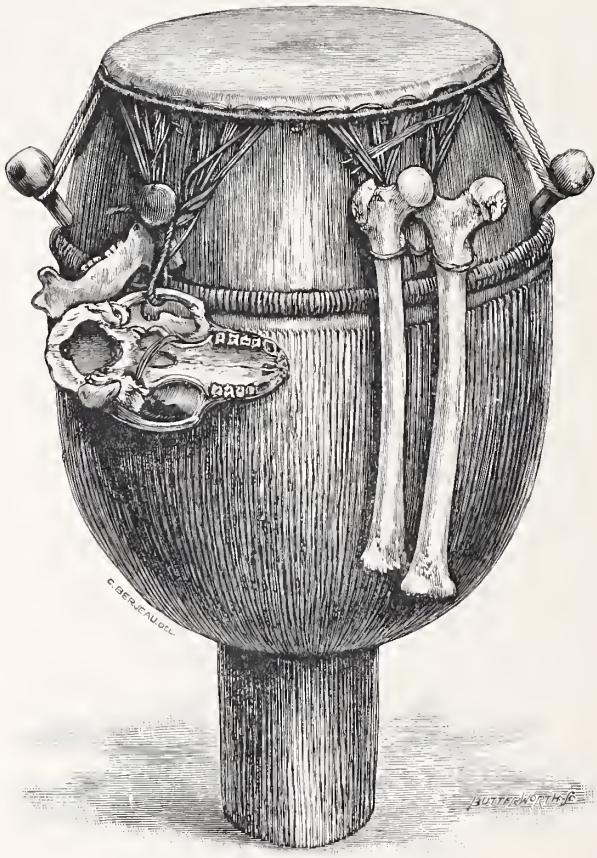


A Sesse Guitar.
It is covered with python's skin.

and the lower end is gently tapped upon the floor : an agreeable soft drumming noise is thus produced.

The drum, or ngoma, is an indispensable accompaniment to all native dances ; hence this word has come to signify a dance. In many instances the band consists entirely of drums, and before dancing begins the drummers tune their instruments to the same pitch

so as not to "mar the dancers' skill." When a drum is not in tune, the drummer collects some grass and makes a small fire, over which he heats the hide until it becomes tense enough to furnish the proper



An Ashantee Fetish Drum. (British Museum.)

note. When drums are played by hand, variations are produced by striking the stretched skin with the palm, the finger-tips, the knuckles, or the closed fist. The music and dancing usually last many hours, and in

native villages situated near European settlements, it is the practice to permit dancing on Saturday night only.

The natives have other kinds of musical instruments, such as flutes and guitars, but the drum furnishes the dance music. Some of the guitars are neatly made and the sound box is covered with thin skin, often that of the python. The men will often play monotonous tunes on such instruments for hours. These guitars are sometimes ornamented with the tail of a goat.

I had heard that in some parts of Uganda a drum-covering is made from the ear of an elephant. My efforts to obtain or see such a drum were unfruitful. It is conceivable that the ear of the African elephant could be used for such a purpose, for some ears measure four feet across.

There is a tract of country extending from the north-west corner of Tanganyika towards the main affluent of the Congo in that region known as the Manyema Country. Pure cannibalism is practised by the Manyema people. They eat their own dead. Thus a father would not eat his own son or daughter, neither would anyone of the same village, so the corpse is given to the natives in a neighbouring village. When anyone is very ill and likely to die, word is sent to the relations in the nearest village, and they await the signal to fetch away the body. The information of the death is generally conveyed by drum-signal. (Cunningham.)

Drums also play a part in fetish-worship, and an extraordinary drum of this kind comes from Ashanti; it is decorated with the thigh bones of human beings and the skull of a baboon. This drum was sounded at human sacrifices.

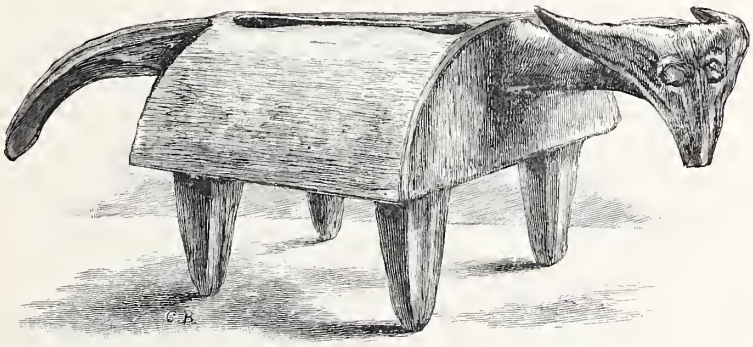
Drums now serve better purposes in Uganda, for they are used to summon the worshippers to church. It is odd that pious people should require to be reminded of their religious duties by means of such discordant sounds as the doleful ringing of bells or the booming of drums.

It has been mentioned already that the term drum is usually restricted to sound-producing instruments in which a tense membrane, stretched across a hollow

In Uganda drums are used instead of bells to call the congregations to worship.

cylinder, is set in vibration by hand or stick. The peculiar booming of a drum can be produced without the aid of a stretched membrane. The Gordon College, Khartoum, possesses a specimen of the remarkable

drum used by the Niam-Niam. It is roughly shaped like an ox, with head and horns attached by a narrow neck to a thick body two feet in diameter, furnished with a tail and supported on four short, thick legs. The whole is cut out of one log. The part representing the body of the ox is as big as an ox and narrow towards the spine. The whole is hollowed out like a trough, with a narrow, slit-like mouth replacing the backbone. The sides of this drum are of unequal thickness and enable the drummer to produce two distinct sounds according to the side struck. The wood is extremely hard and resonant. Schweinfurth states that three important signals are rendered on these drums—one for war; another for hunting, and the third a summons to a festival. The war signal sounded on the drum of a chief and repeated by other drums brings together thousands of armed men when necessary.



War drum of the Niam-Niam. Captured 1905. (Gordon College, Khartoum.)

VIII

THE MASAI. THE SHEPHERD-WARRIORS OF MASAILAND.

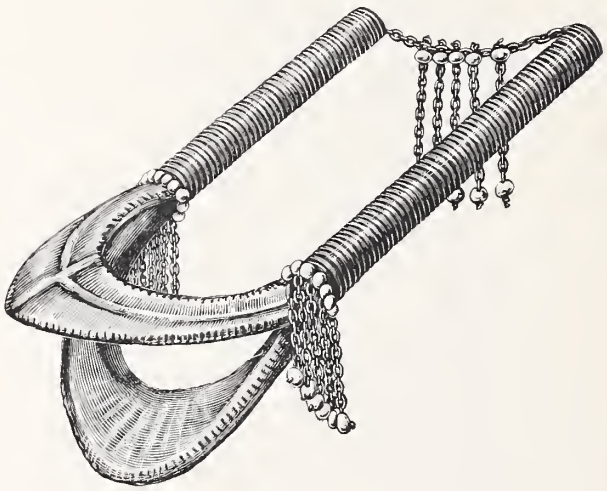
The Masai inhabit the inland districts of British and German East Africa from the equator to 6° S.L. In spite of much research nothing is known of the origin of this race of men: they not only differ widely in language, customs, and organisation from the surrounding tribes, but they are themselves divided into two sections: of these one is pastoral and nomadic, and the other (L-Oikop) agricultural. Both sections avoid the sea-coast and though lakes, like Naivasha and Nakuru, are found in the districts in which they live, they never use a boat or catch a fish.

The males of the tribe are divided into boys, warriors, and elders. The stage of boyhood continues till the age of thirteen or seventeen; then the boys, with much ceremony and mystery, are submitted in batches to circumcision. This operation among the Masai is a complicated procedure and occurs once in five years. Previous to circumcision a boy helps to herd the cattle but after this event he becomes a warrior or Elmuran (often erroneously spelt El Moran); he then plaits his hair, adorns himself with certain ear ornaments, and goes naked with the exception of a small skin which he wears over the shoulders for warmth, not for decency. His outfit as a warrior consists of a spear, shield, bow and arrows, a club and a sword. The shields are made of hide, but they are not all of one pattern: each age and sub-district has its own design. This is also true of the spears and arrows. The Masai rely for their

A Masai Warrior.

weapons and metal ornaments on smiths, usually Ndorobo. Each clan has its own smiths.

The decorations of a warrior are very elaborate. He wears ear-rings, ear-studs, and an arm-clamp. When on the warpath he has a cap of ostrich feathers, or a head-dress made from the mane of a lion. On his leg there is an anklet formed from that part of the skin of the Colobus monkey which has long white hair, or the long hair of the goat. The boys shoot birds with bows



An Arm-clamp which a Masai warrior wears, but only as an ornament. (British Museum.)

and arrows in order to obtain feathers and plumes for the decoration of the warriors.

> The manly dress that marks the warrior's pride—
> Two foes he slew before the raid was done,
> And in their blood his maiden spear was dyed.
> *W. J. Monson.*

The arm-clamps worn by the Masai are of two kinds :—The one worn by warriors is only put on as an ornament. It is taken off when starting on a raid. The arm-ring, which is cut out of a buffalo horn or an

elephant's tusk, is only worn by elders who possess large herds of eattle and many ehildren: it denotes the wearer's wealth. Examples of both kinds of clamp are shown in the British Museum.

When a warrior attains the age of thirty years he marries and settles, and if a man of importanee he may be eleeted ehief. The life of a warrior is a tame affair now that this tribe is under British eontrol. Raiding, eattle stealing, plundering, and murdering are not permitted. Some notion of the extent and frequeney of Masai raids may be gathered from Gregory's statement based on his own observations in 1893.

"South of Merifano on the Tana, Harris and I found the Galla driving their floeks and herds across the river to escape the marauders, and saw the smoke of the burning villages whenee the natives had fled. At the Kiboko river I found the dead bodies of some Wa-Kamba who must have been surprised and murdered in their sleep, as their arrows were still in their sheaths, and their simes in their scabbards. Two days' journey north of this plaee the road was littered with the debris of broken boxes eaptured from a earavan taking stores to Sir Gerald Portal's party in Uganda. Again, on the Kapte plains near Bondini, during our seeond march south from Maehakos, we eneountered a small party of El-Moran, who were on their way to attaek some Ki-Kamba villages. On the plains of the Thika-Thika we met some Kikuyu refugees from Igeti; their eountry had been ravaged by the Masai army which we had seen enkraaled on the shores of Lake Naivasha, and the distriet, for two days' march in length by one in breadth, had been cleared as if by a hurrieane. The fugitives deseribed the sudden attack, the massacre, the devastation of the plantations, the eapture of the cattle and the burning of the villages. And yet as we listened to this siekening story, we realised that this was merely one incident in a eontinuous series of sueh horrors."

The warriors in the zenith of their power would

sometimes take a thousand head of cattle in a single raid. After a sueeessful eapture of cattle the warriors returned to their kraals and divided the spoils.

> The foe is routed : surely not in vain
> Upon our brows we bound the lion's mane.
> With bootless zeal the herdsman tracked our line,
> Far, far ahead we drove the captured kine.
> Their kraals we've burnt, their cattle we have ta'en,
> And now we come in triumph home again.
>
> *W. J. Monson.*

Feasting and fighting among themselves were usual sequels to suceessful raids. Joseph Thomson in his Afriean romanee, *Ulu*, has described a blood-and-meat orgy which followed a eattle raid.

The most remarkable adornments of the men and women are the curious ornaments worn in their ears, especially that known as the 'surutya (see the Essay on Ears).

All tribes whieh disregard elothes as a rule pay great attention to their hair. This is true of the Masai. After the boys have been cireumeised, the hair is allowed to grow and, as soon as it is long enough, worked into plaits. In wet weather the hair is protected by a eap made from the pauneh of a goat.

The women dress in leather garments ; shave their heads and eyebrows ; wear earrings and enease their legs and arms with eoils of iron, brass, or copper wire. The wire eoils are sometimes wound so tightly round the limbs that the wearer moves with diffieulty. The wire eoils around the neek resemble the well-known firework arrangement ealled a Catherine wheel. All these metal ornaments are kept brightly polished.

The young unmarried girls have an agreeable time, for when a boy beeomes a warrior he no longer lives among the married members of his tribe, but in separate kraals with the girls. The newly initiated warrior usually selects the girls with whom he wishes to live. Thus whilst the warriors and girls are philandering and

what is often termed enjoying life by spending their time in dancing, singing, and adorning themselves, the mothers

A Masai Woman.

of the men are engaged in what may be called housework and cooking.

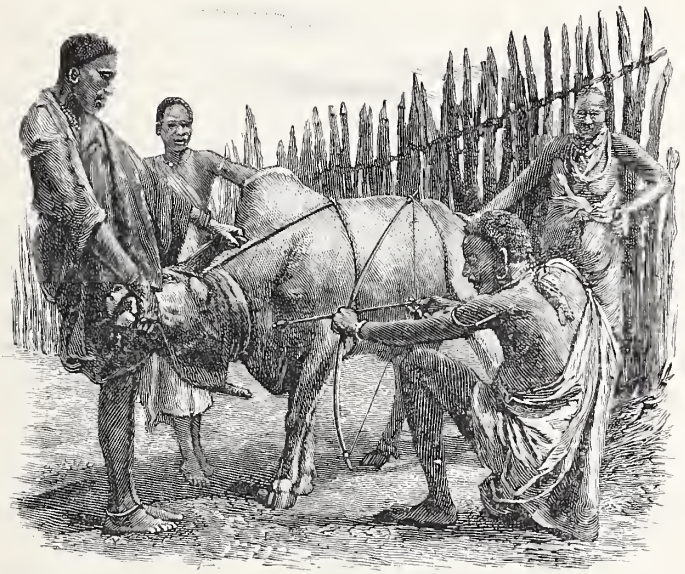
The women also milk the cows and goats, and in this they are assisted by the boys. Now that the Masai no longer raid their neighbours and steal cattle the occupation of the warriors is gone, but these men make excellent herdsmen and are often employed in this capacity by European settlers. The Masai are not only polygamous but also polyandrous, for the wife is lent to a visitor: they are exceedingly immoral. Thomson states that though the Masai and Wa-Kikuyu were eternally at war with each other, there is a compact between them not to molest the womenfolk of either party, and the Masai women would wend their way to a Kikuyu village whilst their relatives were probably engaged in a deadly struggle close at hand.

The Masai are fond of moving, and if the grazing is poor they move to another place. The donkeys and women are the pack animals. It is quite common to meet with a party on the move and find the women laden with babies, bags, gourds, and other utensils; the work of raising the skin tents or building huts devolves on them also. The men accompanying the party merely carry their spears and clubs.

With us to spit upon a thing expresses contempt; with the Masai it is a sign of friendship and respect. The two lower incisor teeth are knocked out in men and women, and no reason is assigned for this practice; in spitting the fluid is ejected through this gap, sometimes in a forcible stream. I first saw the practice in a village. When my conductor entered the village a woman of the tribe advanced and shook hands with him, having previously spat in her palm. My friend spat on his palm, and I noticed that he did not shake hands with what would be called warmth. I mentioned this opinion to him subsequently; he replied that she had expressed her high appreciation of his visit by spitting

too freely into her hand! Among these people spitting is a custom with an infinite variety of meanings.

The Masai take very little trouble with their dead. The corpse is carried a short distance from the village and left to be devoured by hyænas, jackals, and vultures. They believe that when a man dies it is the end as with the cattle. To bury a corpse would, in their idea, poison the soil.



Masai drawing blood from an ox by shooting a blocked arrow into the jugular vein. (From the *Veterinarian*. After R. J. Stordy.)

The principal food of the old men, women, and children is milk. The warriors drive bullocks into the forest and slaughter them for meat. All the members of a village would eat an ox if it died a natural death, or if killed by a snake, or a beast of prey. They are very fond of blood, which is obtained from an ox by shooting a blocked arrow into its jugular vein. The blood they catch in gourds and drink it hot from the

beast. Drinking blood seems a horrible practice, but the poor in England eat a large quantity of blood in the form of a sausage known as "black pudding" which consists of bullocks' blood, spiced, mixed with fat and cooked. Blood is an important ingredient in the haggis so famous in Scotland, and in whose honour Burns wrote a poem describing it as the

"Great Chieftain o' the puddin' race."

Moreover, some thirty years ago the drinking of warm bullocks' blood was advocated as a cure for consumption, and patients afflicted with this disease would regularly attend slaughter-houses in London and drink the prescribed quantity of this supposed specific.

As the Masai live on milk, meat, and blood, and hunt no game, they are dependent on their flocks and herds. Zebras, gazelles, and kongoni run unmolested with the cattle. Their domestic animals are cattle, sheep, goats, donkeys, and dogs. The cattle are humped (zebus) and oxen without humps they treat with disdain. The settlers have crossed some of the native cattle with unhumped species and in two generations the hump disappears.

Anatomically the hump of the zebu consists of fat interspersed with muscle fibre; the latter is derived from the broad thin stratum of muscle known as the panniculus carnosus, immediately beneath the skin. This is the muscle which enables oxen and horses to twitch their skin, especially when irritated by flies. The hump is excellent to eat, especially when salted. The cattle can take care of themselves. It is stated that a herd will charge a leopard, or a hyæna, and leave it a shapeless mass. It is common for a boy of five or six years to be left in charge of a herd of cattle and manage them without difficulty. It is strange that cattle allow children to manage them so easily. Kipling, in the delightful *Jungle Book*, refers to this matter in India: the very cattle, he writes, that

would trample a white man to death allow themselves to be banged and bullied and shouted at by children who hardly come up to their noses.

The Masai love their cattle very much. Each cow is known by name. As the cattle feed on grass the Masai love it on this account. In times of drought the women fasten grass to their clothes and pray. In

A Masai Bull.
The cattle are humped like the Zebu. Oxen without humps the Masai treat with disdain.

a fight grass is used as a sign of peace. They castrate their bulls in the following manner:—The operation is performed on bulls from two to four years. The animal is cast by means of leather thongs; the feet are tied and the wives hang on to the thongs and hold its head down. The cutting instrument is a knife or arrow-head set in a handle. These things are made by the smiths from

native iron, or imported iron wire. An incision is made in the scrotum to expose the gland, which is then pulled out by main force. Both testicles are extracted through a single incision. The animal is then bled from the jugular vein, the opening in the vein being made by shooting a blocked arrow into it. The blood is collected in calabashes to be drunk at the end of the day. As the bull joins the herd, the wife of the operator smears its back with cow-dung for luck. (R. J. Stordy.)

The Masai not only act as veterinarians, but they practise surgery. In treating comminuted fractures they cut down upon the fragments, remove the splinters, bring the broken edges into contact, and suture the wound with sinews from the back of the ox. This is on a level with the best modern surgery. When it is realised that a man's bone cannot be mended, the surgeons fasten a ligature round the limb and amputate it. (Hollis.)

These shepherd warriors are dignified men; they are born orators and conduct lengthy arguments. They are also wags in their way, and exhibit their wit at the expense of the Swahili, whom they despise. The Masai rarely smoke and do not take intoxicating drink: they reckon time by the sun, and fix dates by the moon and rain. There are two rainy seasons annually. Their kraals consist of low, oblong, round-topped huts, placed end to end, surrounding a circular enclosure with a diameter of thirty or forty feet which is used as the stockyard. The framework of the huts is wood and wickerwork filled in with a mixture of cow-dung and mud. The doorway of the hut is a hole which looks towards the stockyard. In building the huts the rafters are completely hidden with the cow-dung and mud mixture except one which protrudes beyond the door: "It is said to be watching the cattle" (Hollis). Outside the continuous line of huts, a strong thorn fence (boma) affords protection against man and wild beasts.

During the dry season such a place is habitable, but in wet weather detestable. In order to protect the roofs of the huts hides are spread over them and tied down or kept in place by stones. These hides not only stink, but are visited by myriads of insects, such as crawl and fly. The central space of the village is a reeking dunghill haunted by clouds of flies.

Bearing in mind the moral and physical conditions under which these people live in their villages, there is ample justification for Routledge's strong opinion, that a Masai kraal near civilisation, *i.e.*, near a railway station, town, or Government post, is a sink of iniquity.

The cattle are the mainstay of the tribe: it was recently estimated that the section of this tribe living in the Naivasha Province owns 35,000 head of cattle and 250,000 goats and sheep.

The white settler finds fault with the Masai on the ground that their great object is to accumulate wealth in the form of herds and flocks. They will not sell any cattle useful for stock purposes: barren and dried up cows they part with to be slaughtered for food. They do not encourage the milk-yielding properties of their cows.

The Masai, however, now play a different part in East Africa from that which they performed thirty years ago: from 1850 to 1885 they were numerous and formidable. Their military organisation made them feared by their neighbours, and they have played an important part in East Africa. For many years they levied toll on the Arab slave dealers, the Swahili traders, and all caravans, whether organised by Arabs or Europeans, which passed through Masailand. Joseph Thomson suffered from their arrogance and exactions in 1883 and has written an excellent account of these bloodthirsty, overbearing warriors.

The Masai have since fallen from their high estate. Rinderpest attacked and destroyed their cattle wholesale. Many of them have died from smallpox, and the

tribes who were raided by them in the days of their power have not been slow in making reprisals for the murdering and plundering of days gone by.

At the present time it is estimated that this tribe in British East Africa do not exceed 25,000: "The Rift Valley and the high plateaus where the fierce bloodthirsty Masai once reigned supreme are becoming colonised by white settlers." Hollis, in his admirable monograph on this tribe, asks the pertinent question: Will the Masai alter his habit or cease to exist? Thoughtful and experienced men, who have carefully studied this question, are of the opinion that any plan of leaving the Masai to themselves, with their old military and social organisation untouched, is fraught with danger to the tribe as well as to the public peace.

Hinde, S. L., and Hinde, H. (Mrs.) — *The Last of the Masai.* London, 1901.

Hollis, A. C. — *The Masai: Language and Folk-lore.* Oxford, 1905.

Stordy, R. J. — "Emasculation of the Bull by the Masai Tribe," *Veterinarian*, 1900, 525.

Thomson, J. — *Through Masailand.* London, 1885.

,, — *Ulu.* An African Romance. 2 vols. London, 1888.

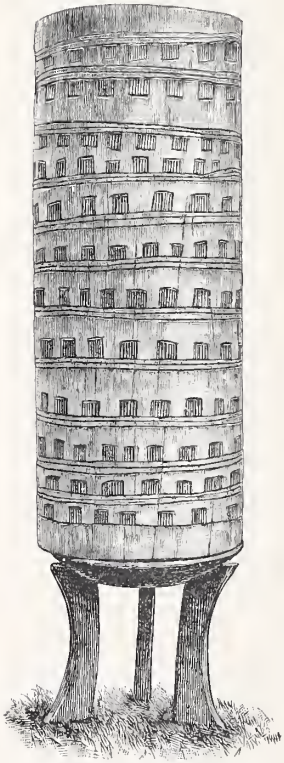
IX

WA-KIKUYU. THE PEOPLE OF THE KIKUYU COUNTRY.

The area commonly known as the Kikuyu country, though traversed by the Uganda Railway, is imperfectly delimited; southward it abuts on the Athi plains; northward it is near the equator; eastward it extends towards Mount Kenia, and westward to the Aberdare mountains and the edge of the Rift Valley. Those parts of this country best known to Europeans, sometimes termed the Kikuyu Highlands, are 6,000 feet above the level of the sea, and were formerly covered with thick forest, but the Wa-Kikuyu have gradually cleared it with the help of fire; now, with the exceptions of patches here and there of virgin forest, the best part of the country consists of undulating land dotted with villages and patches of cultivation. The extremes of temperature experienced at this altitude are trying; in the dry season the temperature varies from below freezing point at midnight to above 90° Fahr. at noon. The weather is unpleasant in the wet season and hailstorms of great violence are fairly common.

The Wa-Kikuyu are agriculturists and grow maize, millet, sugar cane, sweet potatoes, bananas, tobacco, castor-oil trees, beans, and the arum lily. The work in the fields is performed by the women. These people also possess flocks and herds, chiefly goats and sheep, and the care of the animals devolves on the men and boys. The possession of flocks and herds excited the

cupidity of neighbouring tribes, especially the Masai. These two tribes were perpetually at war. The Wa-Kikuyu is the only people which offered any real resistance to the swaggering, fighting, raiding Masai. In order to raid Kikuyu cattle the Masai warriors had to travel through the forest along winding tracts beset with pits, with the enemy lining the side bush with bows and arrows, swords and spears. On the plains the Wa-Kikuyu warriors were no match for them, but in the depths of the forest the El-Muran raiding parties had a bad time.



A Honey Barrel ornamented with poker-work.

The warriors of Kikuyu imitated their warlike neighbours in many ways, such as copying their customs in regard to hair-dressing, decorating themselves with feathers, the hair of goats, the long tails of the guereza monkeys, and the tusks of the wart-hog. Men mutilate their ears in the Masai style, practise circumcision, file their teeth, and possess the habit of standing on one leg. They attach the same value to spitting as a charm and a sign of friendship, and imitate the Masai in their weapons of war, such as spears, swords (sime), bows, arrows, knobkerries, and shields. The warriors also ape the El-Muran in the drinking of blood, which they obtain from the cattle, by piercing the jugular vein by means of the blocked arrow, as practised by their warrior neighbours. Mr. and Mrs. Routledge

have described the comic side of "the drinking of warm blood" in their interesting account of the Kikuyu people.

They make an alcoholic drink from the juice of the sugar cane. The juice is obtained by pounding the cane in a trough with wooden pestles. This is the

A Man of Kikuyu with a gallipot in the distended lobe of the ear.

work of the women. A fermented drink is also made from honey. The Wa-Kikuyu are fond of honey, and honey barrels are seen fixed in the branches of an isolated tree. A honey box in a tree in the Kikuyu country is a feature in the landscape. It is a wooden cylinder,

hollowed out from the trunk of a tree until it consists of a shell about two inches thick ; the exterior is trimmed

Honey Barrel in a tree in a Kikuyu maize shamba.

sometimes quite smoothly, and the ends are occluded by two rounded pieces of wood let into a groove so that they appear like the ends of a barrel. The bees

find their way in through apertures at either end. The boxes are ornamented with poker-work or with a clan design so that the owner is known. The object of the honey barrel is to induce the wild bees to build the comb therein; it is then safe from birds.

The huts are simple one-chambered dwellings. The walls consist of a ring of posts stuck into the ground to support the roof: the interspaces between the posts are filled with wattling and the wall thus formed is bedaubed with clay. The roof-poles extend beyond the wall, so when the hut is thatched with dried reeds or grass the overhanging portion of the roof, which is supported by additional series of poles, forms a verandah. These huts have no windows and the entrance lacks a door, but at night a wickerwork arrangement something like a hurdle, made from a tough creeper, is placed against it and wedged in position by a piece of timber. These huts, though built of such frail material, will, if looked after, last for many years, but a deserted hut soon falls to pieces. A great destroying agent is the termite: and these huts readily catch fire.

The Masai formerly stopped caravans which the Arabs, ivory dealers, and slave raiders conducted through their lands, and demanded toll; the Wa-Kikuyu, on the other hand, pilfered where they could, but they preferred to barter with the Arabs and supply them with grain and food. The bartering with caravans, as all readers of Thomson's journey through Masailand know, is done by the women.

The Wa-Kikuyu have regular market days: on such occasions ornaments and weapons are bartered: iron ore and charcoal are offered for exchange: firewood and grain may be obtained: men can buy beer, and gossip is universal. Such things as salt, string, bananas, birds' skins, earthenware pots, fat, knives, gourds, sugar cane, honey barrels, feathers, tobacco, hides, and skins are there for those who need them.

Formerly barter was the chief means of exchange; beads were accepted as payment, but Government has introduced the cent and this simplifies matters.

The women of Kikuyu are interesting folk: whilst the boys and men are looking after goats and sheep

Whilst the men and boys are looking after the goats or sleeping in the sun, the women are cultivating the shambas, keeping the ground clear of weeds, or fetching big loads of firewood from the forests.

(in former times fighting), or sleeping in the sun, the women are cultivating the land, keeping the plots clear of weeds. They bring in big loads of firewood from the forest. It is also their duty to fetch water either in

huge earthenware jars or gourds. These heavy things they carry on their backs suspended by a broad leather strap passing round the forehead. The younger women pound the grain as well as cook it; and in the daytime,

The young Kikuyu women pound the grain as well as cook it.

when there is nothing more important to do, they may be seen sewing skins and fashioning the peculiar clothes with which they cover themselves.

In these communities there is no washing day: no beds to make: the children require neither washing nor taking to school. No stockings to darn or boots to mend, for they wear nothing on their feet.

The sewing is done by means of an awl and pointed thread : the latter is a fibre obtained from the bark of trees. The string used by them is sometimes made

The Kikuyu women strive to get many rings through the artificial openings in their ears. On one occasion I counted forty-four rings in the pinna ; the majority were in the lobe-loop, but a dozen occupied a slit in the concha.

from the tendons of animals. The Wa-Kikuyu require string for many purposes, such as setting snares, tying cane and reeds into bundles, repairing calabashes, stringing beads, and weaving bags.

Boys run about without any clothes, but even the smallest girls wear leather aprons. Older girls and women wear a leather petticoat of curious shape fastened round the waist; it has two curious pointed lappels hanging in front. The upper part of the body is protected by a leather cloak, which is worn for warmth, but with no idea of concealing the figure.

When the girl is old enough for marriage she wears a band of beads across her forehead, which is also ornamented with shells. The women also wear ear-rings, armlets, and anklets.

The iron they require is obtained from ore found in the country and smelted by their own smiths, who are able to make all the iron articles required, such as iron wire, chains, rings, ornaments, spears, swords, hoes, hammers, collars, &c. They are specially good at making iron wire which is used for the purpose of ornament. At times copper wire is obtainable for chain-making.

The Wa-Kikuyu also make useful pottery. The women are the potters and they mould the soft material by hand. Their methods of hair-dressing are described on p. 156.

Goats play such an important part in the domestic economy of the Masai and the Wa-Kikuyu that they demand some consideration. It is an easy thing to distinguish a horse from an ass when they are seen in real life, but if one is asked to describe or even enumerate the distinguishing points of these two familiar animals the matter is not quite simple. The points which distinguish goats from sheep are less marked and fewer. The Wa-Kikuyu make no distinction between sheep and goats: even zoologists find it difficult to draw a satisfactory line of distinction between them. A typical he-goat has a beard, long angulated, transversely wrinkled horns, and a strong odour. Sheep and goats are prized for their milk, flesh, and skins. A man's wealth is estimated by the size of his flocks and

herds. As goats are used for the purchase of wives (the unit of value being a goat), these animals are therefore carefully watched by day, and at night they are guarded in strong enclosures. The sheep and goats are ear-marked, and, as is the custom with shepherds in Europe, the flocks are counted night and morning. In every village there is a long wooden trough containing salt for the animals to lick.

An ear ornament which the Wa-Kikuyu around Mount Kenia wear in the helix. (British Museum.) The beads of the top row are white: the second row, grey. The third, fourth, fifth, and sixth rows consist of bright blue beads; those of the seventh row are grey, and the basal row is formed of pieces of reeds or straw. The chain is of iron and of native make. The beads attached to the lower end of the chain are white.

According to the Routledges there are some deft-handed surgeons among the natives of Kikuyu. Sword slashes and stab wounds are sewn up. The method of suture is simple: one or more strong thorns are passed deeply through the tissues at the edges of the wound, a hole being made by an awl to enable the thorn to be inserted; a string of vegetable fibre is wound round the thorn in the form of a "figure of eight," which ensures good apposition. Intermediate sutures are used if required. This form of suture was largely used by the best surgeons in the civilised world thirty years ago.

Every man carries a formidable knobkerry or club; at times it is used very freely and many depressed fractures are produced by these weapons.

An account of the Masai and Wa-Kikuyu would be incomplete without an account of their living

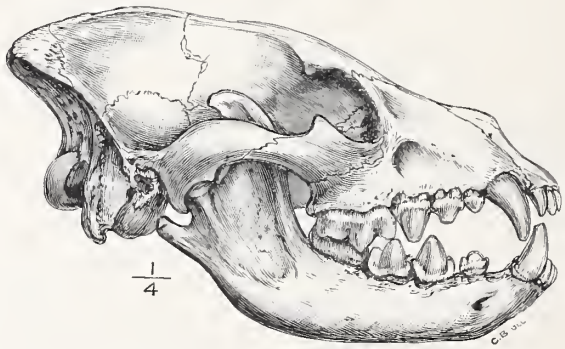
sepulchres—the hyænas. These animals belong to the same group of Carnivora as the cats and civets, but differ from these by their ungainly shape and ugliness. The spotted hyæna (*Hyæna crocuta*) is the species seen in East Africa.

This beast, when full-grown, is nearly three feet in height and nearly six feet from the nose to the tip of

The spotted hyæna, the living sepulchre of the dead Masai and Wa-Kikuyu.

the tail. The hyæna has four toes on each foot, and as the claws are non-retractile its footprints are easily recognised by the marks of the nails, and by being larger than those of the hunting-dog. Its front legs are longer than the hind pair. It is difficult to tell the sex of a hyæna on superficial examination. The voice of the hyæna is extraordinary, on account of the variety

of its sounds; the snarling, hideous, laughing noise it utters round a carcase is only made when they are annoyed or excited. The natives believe that animals and birds talk to one another like human beings. The noise the hyæna makes when he finds a corpse is supposed to be "I have found." Hollis in his account of the Nandi gives numerous examples. The senses of sight and smell are very acute in hyænas. These animals are gregarious and troops of eight or more are common; although they rarely seize wild game they kill donkeys, goats, and even cattle, and they will



Skull of a Hyæna (*Hyæna crocuta*), showing the sectorial or carnassial tooth. The well-marked ridges afford attachment for the powerful muscles of mastication. (Museum of the Royal College of Surgeons, London.)

attack wounded game. Hyænas eat every portion of a wounded carcase, skin, flesh, and bones, their powerful jaws enabling them to crack every bone. A hyæna's skull is easily recognised by the big vertical crest which affords attachment to the powerful muscles which close the jaws. The large upper premolar tooth, which overlaps the lower premolar and forms a powerful pair of shears for cracking bones and biting off pieces of flesh, is known as the sectorial or carnassial tooth.

The hyæna is a great coward, but hunger makes most animals venturesome, so with the hyæna; when

hungry he will carry off babies from the huts and sometimes adults are seriously bitten. It is the habit of the animal to bite pieces off the exposed parts of the body such as the cheek or buttock.

Donaldson Smith gives some facts concerning the strength of the jaws of hyænas. He saw one of these animals pull the horn out of a goat which had been fastened to a stake, and with another bite tear off the whole hind-leg. On one occasion he wounded a hartebeest with a bullet, breaking its leg. A number of hyænas set on the hartebeest and succeeded in pulling it down and began to bite pieces out of the hindquarters; several of them were shot and the rest left the hartebeest. The antelope regained its feet and began to make off, but a merciful bullet finished its career.

Hollis has translated from the Nandi the following folk-tale which explains how leopards got spots on their coats, and hyænas blotches: Two lion whelps seeing some warriors adorned for war thought they would look well if painted. They procured some paint, and one whelp dabbed a number of black spots on the coat of his friend. The spotted whelp began to paint his companion when they heard the cry, "A goat has been lost." The painter then threw the paint-pot at his friend and rushed away to find the lost goat. The spotted whelp became a leopard, the partially painted one, a hyæna.

References: W. Scoresby Routledge and Katherine Routledge *With a Prehistoric People: The Akikûyu of British East Africa* 1910.

X

ORNAMENTS FOR THE EARS AND LIPS (HELIX QUILLS, EAR PLUGS, AND LABRETS)

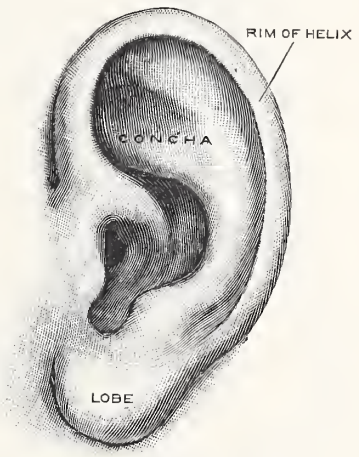
HUMAN vanity assumes many forms, and one of its grotesque expressions is furnished by a study of the ear ornaments of the Masai and Wa-Kikuyu in East Africa. In order to appreciate this phase of fashion and deformity it is necessary to give a short description of the natural ear.

The appendages commonly known as ears are termed auricles or pinnæ by anatomists: each consists of a framework of gristle (yellow elastic cartilage) overlaid with skin furnished with minute hairs, secreting glands, and fat. The skin covering the auricle is abundantly supplied with nerves from several sources and with blood-vessels; its vascularity being declared when the ear becomes delicately pink in harmony with the cheeks when a pretty maiden's face is suffused with a blush. It is also acutely sensitive to cold and physical insults, especially pinching. The various parts of the auricle have received specific names, but there are two parts which it is necessary for the reader to identify in connection with the subject-matter of this chapter. It is also to be borne in mind that the external ear or pinna in human beings is not necessary for the purpose of hearing.

The auricle is bounded by a rim called the helix: the lower part is known as the lobule. The helix consists entirely of gristle covered with skin, whilst the lobule is

mainly a skin-covered piece of fat. The size of the ear varies in different individuals, and the lobe presents great variations in shape and degrees of development in proportion to the helix.

The various contrivances employed for adorning the ears among mankind may be set down in two classes, ear-studs and ear-rings. As a rule, ear-studs are inserted into the helix and ear-rings into the lobe. In some instances the lobe is converted into a loop for the retention of the ornament. In many civilised countries ear-rings are worn in the lobe, and this style of decoration is usually confined to women.



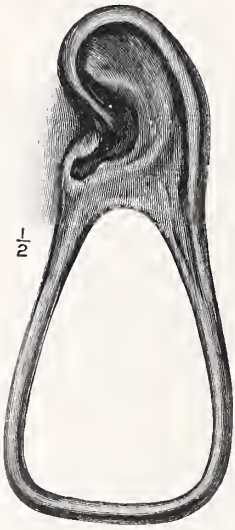
The external Ear, or Pinna.

Among the Masai ornaments are worn in the ear by men and women. When the boys and girls have passed through their "initiation ceremonies," the lobe of the ear is pierced and a thin spigot of wood inserted into the hole. Gradually this hole is enlarged by the introduction of thicker pieces of wood until it is large enough to receive a stone with a groove running round it. These stones vary in size, but the ultimate result is the transformation of the lobe into a rounded cord-like loop, which in the black ears of these men and women looks like a ring of india-rubber. Among the Masai the full size is attained when the cutaneous ring of one side will meet its fellow over the crown.

The largest stone ear-plug in existence was presented to the British Museum by Mr. A. C. Hollis : it weighs two pounds and fourteen ounces.

It would be thought that the ears of these people are larger than those of other men and women, but this is not the case; indeed, Captain S. L. Hinde, who lived among these people in an official capacity for many months, states that the ear of the Masai when left to itself is small and of good shape.

An examination of some of these enormous ring-like lobes shows that the tissue forming the loop undergoes hypertrophy during the dilating process. When the lobe has been stretched to its utmost capacity it becomes the receptacle of many strange things, such as plugs of wood, rings of horn or of ebony; occasionally a can or a gallipot will be found in it. The ear-lobe of the women is also dilated, and they wear a curious earring, as well as a necklace made of iron wire. These coils of iron wire resemble the firework known as a Catherine-wheel. Such ear ornaments, known as 'surutya, are fastened to the lobe by means of a strap of leather with a kauri shell fixed to it.

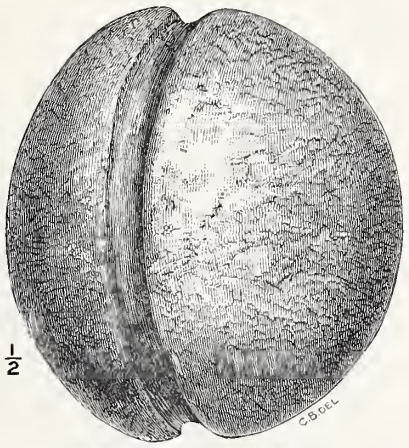


The Ear of a Masai. The lobe is pierced and gradually dilated until it resembles a ring of indiarubber.

In addition to the lobe, the helix is also adorned with ornaments of various kinds. In some the ornaments are thrust into holes made in the rim of the ear, or the concha may be slit below the rim of the helix. The helix is perhaps more freely used by the Wa-Kikuyu than the Masai.

A superficial examination is sufficient to indicate that ornamented ears possess some social or tribal significance. This is indeed the case. Hollis has collected some valuable information on this matter. Women wear necklaces of iron and ear-rings ('surutya) in order

that it shall be known that they are married. Women's ear-rings are of great consequence, for no woman ventures to leave them off during the husband's lifetime. Should she happen to take them off whilst doing her work, she would, on his approach, run into the hut and resume them, so that he should not see her without them. If the husband went away from home she would not venture to take the ear-rings off for fear other men should see her without them.



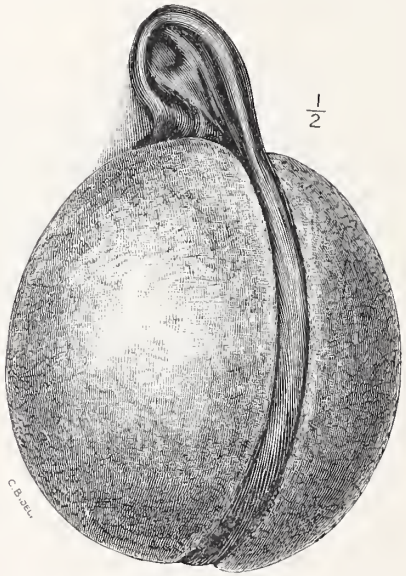
A Stone Ball, weighing 2 lb. 14 oz., used by the Masai for enlarging the hole in the lobe of the ear. (British Museum.)

Boys and girls insert blocks of wood into their ears; warriors and old men wear chain ear-rings. No Masai elder may wear the ear-rings called 'surutya unless he has children who have been circumcised and become warriors. When the father dies the whole family mourns for him; the widows lay aside their ear-rings, necklaces, and beads for a whole year.

Thus it is clear that the ear ornaments are full of significance as representing the age and social state of men, boys and women among the Masai. It doubtless

obtains in other tribes, especially among a closely allied tribe, the Nandi.

The men and women of the Kikuyu country devote much care to the decoration of their ears, and, like the Masai, attach ornaments to the helix as well as to the lobe, but the styles of ear-studs and ear-rings of the Wa-Kikuyu differ in some particular from those of their neighbours.



The Ear of a Masai with the stone *in situ*.

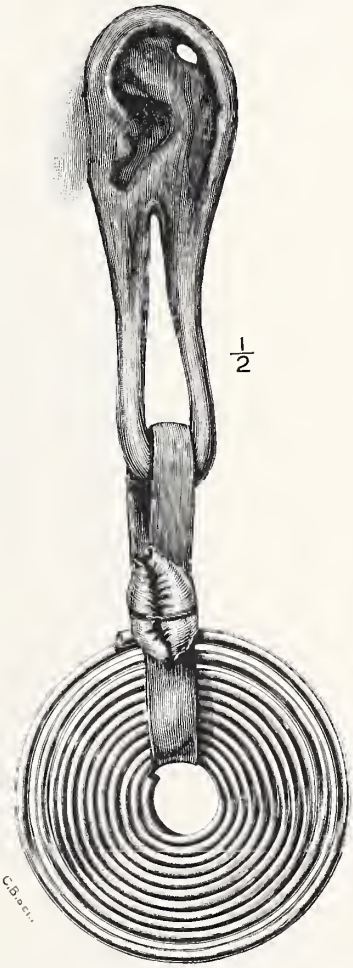
The boys, when they are nearly ripe for circumcision, have the rims of their ears pierced in several places; through the holes three, and occasionally five reeds are introduced; these reeds project from the rim of the helix, but lie in the same plane as the ear.

In the case of women five holes are made in the helix. In its simplest form the ornament consists of a piece of grass with a bead of gum at the base to

prevent it from slipping out. Sometimes the ends of the reeds are fitted into a piece of leather which lies in the depression under the rim of the helix. Occasionally the reeds are adorned with coloured beads. A fairly common ornament for the helix is a piece of silver beaten flat like a leaf. It is made from a Maria Theresa dollar. This coin formerly circulated freely in Africa.

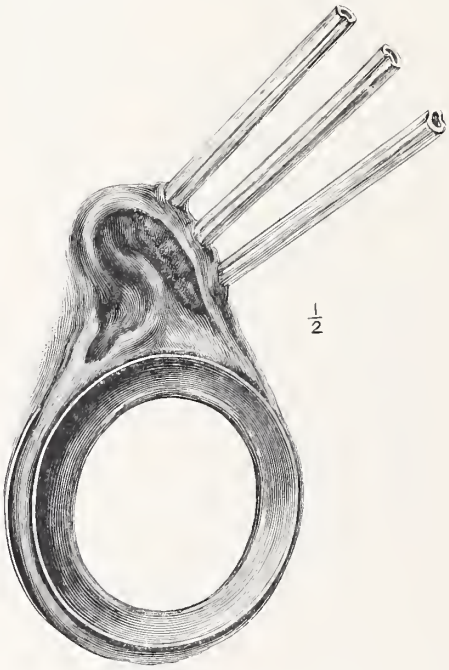
The Wa-Kikuyu also distend the lobe of the ear like the Masai and fit into it a cylinder of wood, a can, or a gallipot. Objects of this kind are usually seen in the ears of men. The women prefer to fill the holes in their ears with large rings made of small beads threaded on wire. These bead rings are not only used in the large hole made in the lobe, but the women often have a long slit made through the concha, and rings of beads are fitted into it.

It would be reasonably anticipated, in view of the great trouble, inconvenience, and, no doubt, some physical suffering involved in transforming the lobe of the ear into a rubber-



The Masai Ear-ring ('surutya). No Masai elder is allowed to wear this ornament unless he has children who have been circumcised and become warriors.

like cord of tissue capable of surrounding a cylindrical jar, or a disc of wood, with a diameter of three or four inches, that these deformed ears are regarded by their owners with pride and their neighbours with envy. This is the case. To break one of these rings of tissue is a great offence. In all countries, civilised and uncivilised, rival beauties



The Ear of a Kikuyu man with a ring in the lobe and reeds in the helix.

are liable to quarrel and even fight desperately; in such encounters each combatant endeavours to ruin the beauty of her rival. Scratching furrows in the cheeks is a common form of revenge. Shakespeare, in his description of the scene in which Margaret, Queen to Henry VI., boxes the ears of Eleanor Cobham, Duchess of Gloucester, makes the angry duchess shriek:

Could I come near your beauty with my nails,
I'd set my ten commandments in your face.

This is a neat referenee to the marks left by ten finger nails.

The Kikuyu women when they "fall out" snateh at each other's ear loops and endeavour to break them.

A Kikuyu man with a plug of wood in the lobe of the ear.

A surgeon, who praetises in Nairobi informs me that on several oeeasions, he has sueeeeded in reuniting ear-loops broken in this way, and the natives have men among them who perform plastic surgery of this kind very suceessfully.

As a result of the British oeeupation of the Proteetor-

ate many Swahili, Masai, and Wa-Kikuyu have been trained as police (askari) and soldiers (The King's African Rifles). Ear ornaments under such conditions are not wanted, but in order to preserve the ear-loop it is hooked over the helix, where it is safe from harm. As soon as the askari (native policeman) has finished the term of service, usually about three years, he returns to his tribe, abandons uniform, resumes ear-rings, spear, knobkerry (club), and skin; becoming once more an unclothed native, he smears himself with greasy clay, and joins in the village dance. That these men should become policemen, and protect the tribes they formerly robbed and murdered, illustrates the conditions now prevailing in Masailand.

The love of personal adornment is very great among these people. Schillings tells of a Masai boy who had been many times to Germany and had mastered the language. On becoming a man he decided to return to his people, and was subsequently seen by a European who knew him, covered with clay and his hair in long plaits dripping with grease, in company with a fellow-tribesman in full war dress.

The mutilation of ears is by no means confined to human beings. The ears of cattle, sheep, and donkeys are marked for identification purposes. The ear-marks are of two kinds—branding and slitting. Among the Masai there is for each clan and family a principal mark, and all the cattle belonging to the various members of a family are branded in a special way. There are also small marks by which the actual owner can be recognised. This is also true of the special methods of slitting ears. Some of the ear-slitting designs are curious; on meeting Somali traders with a herd of cattle I always found it amusing to examine the odd patterns cut in the ears of the oxen.

In connexion with this matter it should be borne in mind that in the early days of the Israelites, if a man-servant wished to serve his master for ever, a hole was

bored through his ear "with an aul" (Exodus xxi. 6). Ear-marking is a very old custom.

Lip Ornaments or Labrets.—Some African tribes, especially those living in the Nile Valley, follow the practice of decorating the upper or the lower lip by piercing it and subsequently dilating the hole until it will accommodate a plug of wood in some instances as large as that used by the Masai and Wa-Kikuyu for their ears. Several African travellers have drawn attention to this fashion, especially Schweinfurth in his

A native of the Makonde plateau with a labret and ear plugs. (From Weŭle's *Native Life in East Africa.*)

description of the Bongo and Mittoo women (1873) and more recently by Weŭle, who observed it among the tribes inhabiting the Makonde plateau and the surrounding country.

Discs of wood for the upper lip are known as the *pelélé* and the lip is prepared for its reception in the same way as the lobe of the ear among the Masai. The lip is pierced with an awl when the girl is about eight years of age: the hole is kept open by means of a piece

A Young Woman of the Murle Tribe living near Lake Rudolf.

The labret is a portion of the horn of an ox; the ends are plugged with wood. The lower incisor teeth have been removed. The beads of her neeklace are made from the shells of ostrich eggs. (From von Hohnel's account of *Count Teleki's Journey to Lake Rudolf.*)

of grass, and further enlarged by using thicker grass or two or three stalks, until it is big enough to receive a piece of palm leaf made into a roll. In time the opening in the lip is big enough to receive a disc of

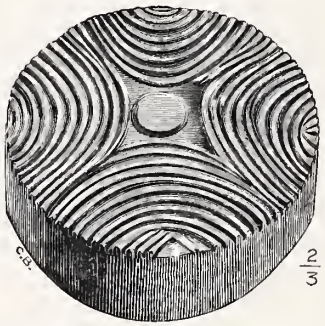
ebony or wood two to three inches in diameter. Some of the women wear a metal pin or peg in the lower lip. This wooden plug is daily whitened with carefully washed kaolin. The girl's lip is usually pierced by her maternal uncle; the mother is responsible for maintaining and enlarging the hole. The day is kept as a festival when the first solid plug is inserted, and a husband cuts a new pelélé for his wife. When a girl with a labret chatters freely the eye can scarcely follow the motion of the disc, and when she laughs the comic effect is indescribable. Livingstone mentions the pelélé as being worn by women on the Zambesi (1856). Sekwebu, his faithful guide, remarked, "These women want to make their mouths like those of ducks." Subsequently, in the Rovuma valley he saw men as well as women wearing the pelélé, and noticed that in some cases its pressure on the upper gum and front teeth caused an alteration in their natural curve, for the teeth and the bone in which they were implanted curved inward instead of outward.

Schweinfurth states that the labrets among the Mittoo women are made of ivory, ebony, or quartz. When drinking, the women raise the upper lip with the finger. In some of the Suk people, the lower lip is pierced and in the hole a bird or porcupine quill is inserted; sometimes a piece of brass or a tooth. The natives in some parts of South America known as the Botocudos wear solid lip ornaments, and their name is derived from this habit, for the Portuguese word *botoque* means a plug.

The most extraordinary form of labret found in East Africa occurs among the women of the Murle tribe living near Lake Stefanie. A hole is bored through the lower lip, and this hole is gradually enlarged until a piece of ox-horn three to three and a half inches thick, and three inches long, can be inserted. The two openings in the piece of horn are plugged with wood. The mouth by this means is kept open and as

the lower incisors are broken off, the tongue exposed to view, producing an unpleasant appearance. L. von Höhnel gives an account of this tribe in his description of Count Teleki's expedition.

Donaldson Smith, who subsequently visited Lake Stefanie, states that the girls of the Murle (Marle) tribe have good figures and regular oval features. The men mutilate the lips of the women in order to keep them from being stolen by their neighbours.



An Ornamented Labret or Lip Plug, called Pelélé. (British Museum.)

XI

THE NDOROBO—THE NAKED HUNTERS OF THE MAU FOREST

Primitive man has often been depicted as living stark naked, hunting animals with bow and arrow; eating flesh uncooked; living in holes in trees, in caves, or under shelters made of boughs, leaves, or dried grass. There is no need to draw on the imagination, for the Ndorobo living in the thick forests bordering the Mau Escarpment, fulfil these conditions. These natural hunters live in the thick forests, where they shoot birds and the Colobus monkey with poisoned arrows. They obtain larger mammals by digging narrow pits across their tracks. These pits are prepared at various angles and the game driven towards them: the animals stumble into the narrow pits and fall, breaking their legs and sometimes their backs. The largest animals are caught in regular gamepits.

The Ndorobo use a peculiar weapon for hunting the elephant of which Thomson has given a good description. In shape it is something like the rammer of a cannon, the heavy head giving additional weight in dealing a blow. The thickened part holds a weapon shaped like a dart or arrow; the sharp end of the dart is smeared with a deadly poison. When the terminal piece is in position the whole weapon measures about eight feet in length.

With this spear the elephant is attacked at close quarters; the dart is driven into its body and being loosely fixed in the handle it sticks in the animal:

Ndorobo Elephant Spear. A. The Dart. (British Museum.)

the handle of the harpoon remains with the hunter. Another dart is placed in the handle and the operation is repeated when circumstances are favourable. In making the thrust, the hunter endeavours to stick the dart in the abdomen where the intestines lie.

The shaft of the arrow-like portion of this complicated spear is made of the wood of the wild olive. The wood of this tree is used for singularly varied purposes in different parts of the world. In East Africa it is used for spears and railway sleepers: in Palestine, especially at Jerusalem, it is employed to make penholders and the covers of books, especially prayer-books and Bibles.

The Ndorobo are quite naked when living in the wood, but when among white men, who employ them as trackers, they wear a blanket over the shoulders. Their ears are disfigured by helix-quills, by rings, and plugs of wood inserted into the lobes. They do not tattoo their bodies, but they dress their hair after the fashion of the Masai.

The Ndorobo do not form large tribes, but conceal themselves in the forest, where they live in holes or under shelters made of grass, and slink about the forest. Occasionally they come out to barter the proceeds of their hunting with the settlers. When an animal is killed they eat the flesh uncooked, and are particularly fond of the viscera, the paunch of ruminants, and the soft internal fat of the abdomen: they often fight with each other to obtain choice morsels.

The country in which the Ndorobo

live is full of flowers, so that honey abounds. Like the Wa-Kikuyu, they are fond of honey and their hives are made on the same plan as the Kikuyu honey-barrels.

Ethiopian bees are very ferocious, and many explorers have had trouble with them. Macdonald describes them as pugnacious, and with good reason, for whilst

An Ndorobo with large ear-buckets *in situ*.

engaged in surveying for the Uganda Railway his caravan was attacked by bees in the Wakamba settlements. On one occasion when the men were collected after a general stampede caused by bees one man, a Msoga, was missing. When found, "his body, owing to the innumerable stings left in him, instead of smooth black skin, appeared covered with close brown fur." The poor man was placed in the hands of a hospital assistant, but

he died in five hours. Near Ribi, in Ukamba, the same caravan was attacked by bees and two donkeys were stung to death.

When spending an afternoon with a settler near Nakuru I noticed some bees buzzing around a corner of the dairy and drew his attention to their presence. He then expressed his dislike of the African bee, for he said that when disturbed they stung viciously and badly: they attacked the animals in the farm-yard and even stung fowls to death. He added, the honey is not worth eating. The Ndorobo do not share this opinion: when in want of honey they climb the tree, thrust their hands into the hive, pull out the comb and drop it down to their expectant companions. The man robbing the hive is unclothed, but he does not appear to mind being stung. Now and then, if a bee stings him very badly, he will desist for a moment to kill the bee and then continue to rob the hive. This statement is made on the authority of an eye-witness. Inquiry, however, shows that some natives at least take the precaution to smoke the hive, and Major Powell-Cotton gives a careful description of the preparation of a fire for the purpose of smoking out bees in the Mau Forest.

Hollis in his account of the Nandi gives some curious information in relation to these men and bees :—

In March, 1908, he was on the point of encamping at the foot of the Nandi escarpment when his porters, pursued by bees, abandoned their loads. In the course of the afternoon three unsuccessful attempts were made to recover the loads and several porters were badly stung. At four o'clock in the afternoon a Nandi strolled into the camp and volunteered to quiet the bees, as he was of the "bee totem," and the bees belonged to him. The Nandi was stark naked and started off to the spot where the loads were, whistling loudly in the same way as these men whistle to their cattle. The bees swarmed round and on him, but beyond brushing them lightly from his arms he took no notice of them and,

still whistling loudly, proceeded to the tree which held the hive. In a few minutes he returned, none the worse for his venture, and we were able to fetch our loads.

Almost all travellers in East Africa have had unpleasant experiences with bees. Profiting by experience, caravans, when passing in the near neighbourhood of trees containing bee hives or honey-barrels, observe strict silence, for bees resent noises and quickly put a company of naked porters to flight.

The poison used by the Ndorobo for their arrows and spears is obtained by boiling the leaves and branches of *Acocanthera Schimperi* for several hours ; the liquid is strained and then reboiled until it is thick, viscid, and like pitch. It is kept in sheets of bark for use. The poison is very powerful, for when a beast has been shot with a poisoned arrow it dies quickly. (Johnston.)

An official who has seen a great deal of the Ndorobo informed me that on one occasion two men were quarrelling, and one of them held his spear in such a threatening attitude that the other seized it with his hand and received a wound in the palm. The wounded man died in a few minutes with symptoms similar to those produced by a poisonous dose of strychnia. The poison will quickly destroy an antelope or a buffalo.

A. H. Neumann records the case of an Ndorobo who was unable to get within striking distance of an elephant, so he sat down and chewed tobacco ; on getting up to renew the chase he scratched his leg against the poisoned point of a dart "and died right away."

They obtain fire by means of a fire-stick and drill. The apparatus consists of a soft piece of wood which rests upon the ground and is usually known as the fire-stick : it is furnished with rounded slots, and in the edge of each slot there is a recess in which the dust made by the drill accumulates. The end of a round stick of hard wood known as the drill, or twirling stick, is placed in one of the slots and made to revolve rapidly

by the hands: this motion causes the soft wood to come away as fine dust, and the heat generated by the friction of the drill against the fire-stick ignites the wood-dust. Whilst rotating the drill the fire-maker keeps the stick firm by means of his toes. When the dust glows, a little dry grass is dropped over it and some cautious blowing produces a flame.

All this sounds delightfully simple: an expert native will obtain sparks and a fire in half a minute, but an

An Ndorobo obtaining fire by means of a fire-stick and drill.

inexperienced man may twirl the drill for an hour and then give up the work in despair. The drill must be twirled with a uniform motion; the blowing, to produce a flame from the glowing dust, should be steady and uniform.

The smelting of iron is probably one of the oldest industries in the world, and the art was discovered independently by different races of men. The occupation of Tubal-cain exists among the natives of East Africa

and is especially cultivated by the Ndorobo. These men smelt the iron and make their own arrow-points and spear-heads. Many of the smiths employed by the Masai are Ndorobo.

In villages bordering on the railway there is very little smelting carried out now because it is so easy to obtain imported iron. Thefts of iron along the railway used to be common; the keys with which the rails are fastened to the sleepers were often stolen.

It is difficult for Europeans to watch the native smiths at work, and some of their tools are regarded with great mystery, especially the bellows. The tools are few in number, and comprise an anvil, usually of stone, a hammer, tongs, and bellows. It is not easy to obtain specimens of their tools. Ethiopian artisans, like the workmen in civilised countries, delight to surround their craft with mystery. In this they are on a par with some of the learned professions which complicate their art with the jargon of dog-Latin and complicated phraseology.

The Ndorobo use the ordinary bow and arrow, but only for smaller game. These men are useful to the Masai, not only serving them as smiths, but also for the ivory they obtain in hunting the elephant: this is appropriated by the Masai. The Ndorobo are a shy race; all their trading transactions are done secretly, or they would be robbed of everything by their stronger neighbours. They are very persistent in killing with poisoned arrows the beautiful Guereza or Colobus monkeys. They hunt this monkey because they eat its flesh and the beautiful skin finds ready purchasers. The Masai and the Wa-Kikuyu warriors use those parts of the skin with the long tufts of white hair as ornaments for their legs when in full dress, and the officers of a well-known British regiment employ the skins for sporrans. This beautiful monkey is named Colobus (from the Greek word signifying mutilated) because it has no thumb: its hands are four-

fingered, but the thumb is sometimes indicated in adult monkeys by a nail. In one species, the red Colobus, which lives in the forests of Western Toro to the east of Ruwenzori, the thumb is present in the young monkeys, but as they become adult it dwindles till only a small nail is left: in very old animals even this disappears.

The Guereza or Colobus Monkey.
This conspicuously coloured animal is seen with difficulty when sitting on a tree-top whose branches are covered with the long beard moss. When the monkey jumps from one tree to another the long hair spreads out, and it looks like moss suddenly come to life.

Colobus monkeys are peculiar to Africa. The common species are remarkable for their peculiar coloration and the length of their hair. The long white hair which looks like a mane on the sides of the body and the long tail with the fluffy white plume at its end are very striking. Both sexes have stiff white

whiskers. There is much variety in the coloration and in the distribution of the long hair in the different species. These monkeys are found in dense forests and live almost entirely on leaves which they tear from the branches in an impetuous manner; they also eat eggs of birds and sometimes young birds. Though they are so conspicuously coloured when seen apart from their natural surroundings, it is surprising to realise that they are not easily seen when sitting on a branch in a tree-top on the edge of the forest, where the trunks and thick branches of the trees are thickly covered with the long beard moss. In reference to this, Schillings writes :—" Their bushy white tails hang low, and as they jump, the hair of their bodies spreads out, giving them a unique appearance, like lichen suddenly come to life."

The Guereza hardly ever comes to the ground. It finds water to drink in the cavities of old trees, and its long legs are not suitable for progression on a flat surface. Nearly all attempts to bring this monkey alive to Europe have failed. One specimen brought to Germany by Schillings lived in the Zoological Gardens, Berlin, two years.

XII

THE KAVIRONDOS—THE NATIVES OF THE KAVIRONDO COUNTRY

The natives of the Kisumu Province are of great interest. This province was formerly included in the Uganda Protectorate; it has a total area of nearly 22,000 square miles and a population approaching one and a half millions. The Uganda Railway traverses the country between the Mau Plateau and Lake Victoria, known as the Kavirondo plains, and it is extremely fertile. The mountains inhabited by the warlike Nandi tribe lies to the north-east, and the natural boundary, known as the Nandi escarpment, sharply divides the Nandi and Kavirondos from each other. The Nandi were very troublesome, but a punitive expedition sent into their country in 1906 has had good consequences and made them peaceable neighbours; it also allowed officers who accompanied the expedition to make some useful ethnographic observations. The Nandi were a perpetual menace to the Kavirondos. This helps to explain the mud, and in some instances, stone walls around Kavirondo villages. On one occasion, during the construction of the Uganda Railway, the surveyors wished to make arrangements for buying up a Kavirondo village that lay in the way of the railway. During the negotiations the Nandi saved the surveyors this trouble by wiping out the village.

The natives of the Kisumu province are very varied, but those frequently seen along the railway in this part

of its course are Kavirondos. As the train passes near their villages and "shambas," as the cultivated patches are called, the men, women, and children will run out to watch the train go by and race each other to reach the line. Some of them assume the curious posture of standing on one leg with the sole of the foot placed on the thigh of the other limb.

Kavirondo men, women, and children go about stark naked. Married women wear a thin narrow girdle around the waist with a tassel hanging behind. Matrons have a short leather apron ornamented with beads suspended from the girdle in front. The tassel, made of fibre usually obtained from a species of aloe, is about twelve inches long, dyed black, and very pliant. It is the especial mark of a married woman (Hobley). When a young girl goes on a visit to another village, she wears a tassel or tail on her journey, but must take it off on reaching her destination and not don it again until she leaves. By wearing the tail she is taken for a married woman, and is not likely to be molested by anyone she may happen to meet on the way.

Although the girls and women of Kavirondo go about naked, married women wear a thin narrow girdle, which supports a tassel behind.

If a woman who has borne a child runs out of her hut in a hurry, for example, if she has been beaten, and goes into another hut without her tail, the hut she

enters is considered unclean, and her husband has to give a goat, which is killed on the doorstep of that house,

The "Mkia" or tail is made of fibre usually obtained from a species of aloe. Among the Karamajo the tail is decorated with beads. (British Museum.)

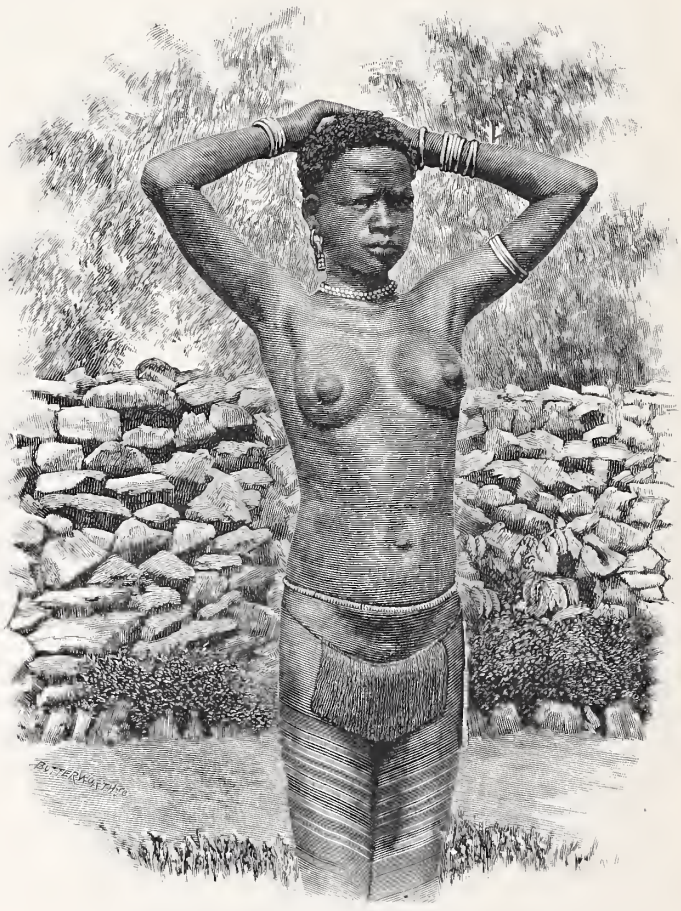
before it is considered to be purified; the meat is divided between the aggressor and the owner of the house.

A woman is not entitled to don the tail immediately after marriage, but has to wait a month or two; the husband then presents her with a goat wherewith to purchase it. If a man of the same tribe touch the tail he commits a great offence, even if it be the woman's husband. Unless atonement be made by the sacrifice of a goat, it is believed that the woman will die of the insult. If it be torn off by an enemy or a stranger no harm is done.

The Kavirondos have a superstition that if a woman wears a cloth round her loins she will have no children. J. F. Cunningham, when making a visit to one of their villages, found himself surrounded by a batch of naked young women. He thought to improve their appearance, and gave them some pieces of American sheeting to wrap round their loins, and showed them how to do it, but the girls threw the stuff away, saying, "Foreign customs; we don't want them here." Cook in his first voyage among the South Sea Islands found the natives naked. He gave one an old shirt. To the captain's surprise the recipient bound it round his head like a turban instead of using it to cover any part of his body.

The Kavirondo women are tattooed on the belly. Mr. Hobley states that all Kisumu girls are tattooed just below the navel. When a woman first becomes pregnant more elaborate tattooings are added in front as high as the breasts, and a belt of markings is carried round the waist. Tattooing is a matter of choice with the men. Major Powell-Cotton, when among the Turkana and Suk tribes which live in a country adjacent to the Kisumu Province, noticed curious little tattoo marks on the bodies of the warriors, and it was explained to him that they were a tally of the number of the people the man had killed. For the first man slain a series of lines of little scars is made on the right arm by thrusting a needle through the skin and

snipping off the piece so raised. For the second victim a patch of similar scars is made on the shoulder, for the third on the chest, and so on. The left side is similarly



A Kavirondo matron wears an apron made of fibre.

decorated according to the number of women killed. When the man's body is covered to the waist, his own decorations are considered complete, and he continues

the record on the body of his wife. The patterns are not coloured in the way we usually understood as tattooing. The skin is incised and then rubbed with an

A Jaluo girl showing one mode of arranging the hair. She has a pattern scarified on the belly. (After Hobley.)

irritant which produces a thick scar, or keloid: this method is known as scarification.

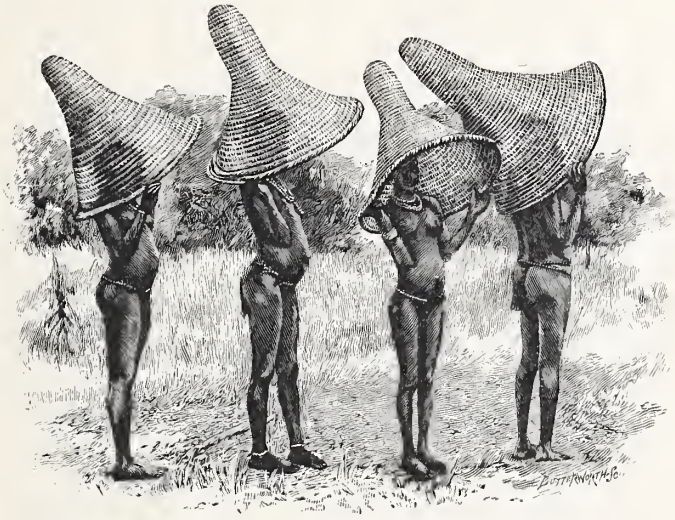
The Kavirondos are keen traders and industrious cultivators. They grow in excess of their own require-

ments and much of the produce finds its way into the local markets, especially that of Kisumu. At this market, fish, fowls, and eggs as well as fresh milk can be obtained. They are fond of fish, which they catch by rod and line and in traps. These traps consist of converging walls of stone carried into the bed of the river at an angle of about sixty degrees: the space between the stone walls is filled with fish baskets. The fish coming down stream have their only exit blocked. Around Kisumu we found them diligently fishing in the lake, and they appeared to obtain good catches of fish by means of seines made of dried papyrus stems. A seine is a large net, one end of which is provided with sinkers and the other with floats. It hangs vertically in the water and, when its ends are brought together or drawn ashore, encloses the fish. The seines are arranged in the water by a man on a raft made of the dried stems of the papyrus, or of ambatch.

The Kavirondos possess cattle and use milk, but as all readers of Thomson's description of this race know, they dilute it with cow's urine. They also clean the milk vessels with cow-dung. I made some inquiry into this matter and find it is the practice to keep the milk after it has been mixed with cow's urine for two or three days, as these people prefer to drink it sour.

The Kavirondos smelt and work their own iron. Thomson has given an interesting account of their methods: he was astonished at the dexterity with which the men worked a very primitive form of bellows. He found that with very crude apparatus they could produce fifteen to twenty pounds of metal in a day. The wire made here is square instead of round, but it takes a beautiful silvery polish and is used in the form of rings to ornament the arms, legs, and necks of the fashionable young men and women of the village. The blacksmiths are very clever and make weapons such as spears, and agricultural implements such as hoes.

Tobacco is grown in the province and it is smoked in pipes by men and women: it is also taken as snuff. Hemp is smoked in a "hubble-bubble," which is usually made out of a gourd. Virginian tobacco has made its way and grows well in the Old World and penetrated throughout Africa. The African has no native name for it but a variation of tobacco. Pagan negroes uninfluenced by Islam smoke tobacco, those



Kavirondo Women with Fish Baskets. (After Hobley.)

who have embraced Mahomedanism chew the leaf (Schweinfurth).

The Kavirondo people are very industrious; in addition to their agricultural work, they look after bees and extract the wax from the honey. They make dug-out canoes and use them to cross the rivers. Salt is obtained from the ash of burnt reeds and water plants. Pottery is made from red and black clay; the moulding of the vessels is carried out with an eye to

utility rather than beauty. They make baskets for fish, and neat cages for quails by plaiting grass. The quail cages are quite a feature of their villages; they are suspended on long poles hung at a slant near the entrances and each cage contains one quail. When in use snares are set in the neighbourhood of the poles and the cage-birds are excellent decoys.

These people have many strange and unmentionable customs. Though wives are obtained by purchase, it is regarded as a shameful thing if a girl is not found to

The Stone Wall of a Kavirondo Village.

be a virgin on her wedding day, and this matter has to be demonstrated in public.

As in civilised communities, even the highest, the names of children are often suggested by some event happening at the time. For example, as Hobley points out, when Europeans were great rarities in the country, a child born on the day when a caravan camped at the village, would often be named after the leader of it, if he chanced to be well known. Thus Jacksinis, Martinis, and Obilis are very common,

the native renderings of Jackson, Martin, and Hobley. Martin was Thomson's famous headman.

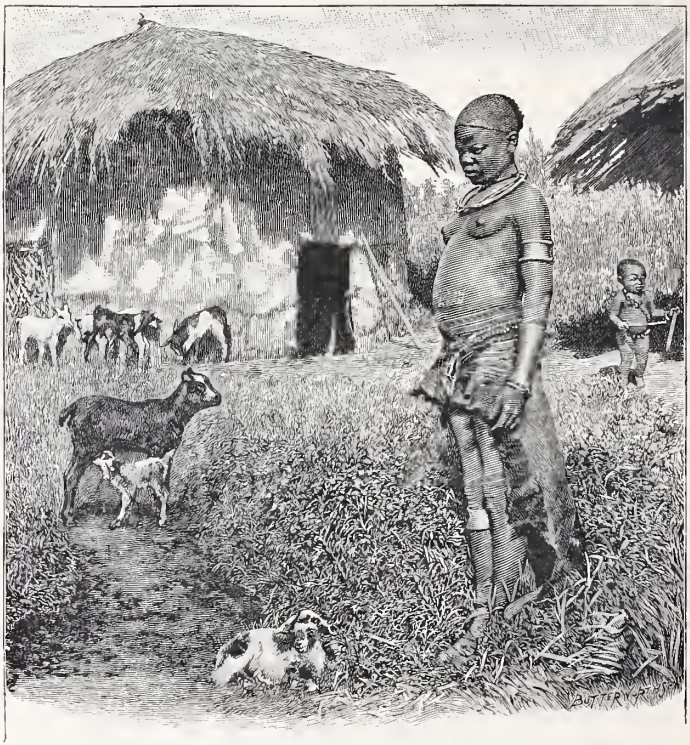
Livingstone recorded a similar observation in the

The Interior of a Kavirondo Village.
The smaller hut is a granary and access is obtained to its interior by lifting off the roof. The trees are Candelabra euphorbias.

following way : African natives have no written records, but remarkable events are commemorated in the naming of children. This especially applies to the

visit of white men in the early days of European exploration of Africa.

This fashion of selecting names from passing or uncommon events is by no means confined to Ethiopians. The wife of a clergyman at Berne, Switzerland, gave birth to a daughter at dawn,



An Unmarried Girl (Ndito) of the Kissii Tribe.

May 19th, 1910, when Halley's comet was nearest to the earth; the mother insisted on calling her new-born daughter Cometa in honour of the aërial visitor. The girl child was duly christened Cometa Rudolf in the presence of relations and friends in church.

The Kavirondo bury their dead in a grave dug in the middle of their own hut, but the habitation is not used again. A chief or other person of importance is buried in the floor of his own hut in a sitting position, with the head protruding just above the ground. The exposed head is covered with an earthenware pot and the principal wives watch it, until the ants have completely cleared the skull of flesh; the skeleton is then dug up and re-interred near at hand. (Johnston.)

Kavirondo Milkmaid.

Those who know the Kavirondos best ascribe to them a higher code of morality than exists in other tribes inhabiting the East Africa Protectorate, especially those which make the greatest efforts to hide their nakedness. Judging from inquiries I made on this matter it appeared to me that morality is a thing which has no meaning among Africans.

It is an odd contrast to their complete nakedness that the men adorn their heads with circlets of hippopotamus ivory, tusks of the wart-hogs, large tufts of black ostrich feathers, or the long tails of birds. They also construct hats of gigantic size which are worn on important occasions. These hats, made of basket-work plastered with clay, adorned with feathers, antelopes' horns, and similar things, are sometimes six feet high. These fantastic head-dresses always interest travellers.

Belief in spirits, good and evil, is entertained by the human race, savage and civilised. The object of nearly all forms of religion is the propitiation of spirits.

The methods practised among the savage races and the tribes living around the Victoria Nyanza for effecting this are curious and quaint. That which interested me most is the habit of wearing charms, and the natives of Kavirondo possess a multitude of such objects. All primitive people are reticent on matters connected with their beliefs, and the savages in Kavirondo are equally shy on these matters. The natives of the lake shore and its islands have such anthropomorphic notions of spirits that they build little fetish-huts or spirit-shelters in the fields or woods, wherein they place offerings of food and water. There are more altars "to the unknown god" in Eastern Ethiopia than Paul found in pagan Athens.

There is a little doorway always open in the back of some of the huts in order that the spirits of the departed may easily enter if they should perchance return: a beautiful idea.

A charm, in the terms of the dictionary, is defined as "anything worn for its supposed efficacy to the wearer in averting ill or securing good." Those who wear them cannot always explain why such and such charms produce certain effects. Many natives near the lake plant a stick in the field and tie a feather from a white chicken to it, not with the object of scaring birds, but as a charm against hail. An old earthenware pot is stuck on the spike of the central pole of a conical hut to save the babies from squinting. The customs for appeasing evil spirits are not always so simple.

Hobley, in his interesting account of Kavirondo charms, tells how he induced a chief in a confi-

dential moment to tell him the origin and character of the sets of charms he wore round his neck. They were :—

1. Iron arrow points, given him the day he was named.

2. A strip of thin iron with three holes punched in it. This signified the name of his grandmother. A.

3. A transparent rock crystal said to have been picked up in the lake. (Perhaps dropped by a visitor.) The crystal is secured in a neat leather cup. B.

4. A piece of yellowstone which was worn by his father. C.

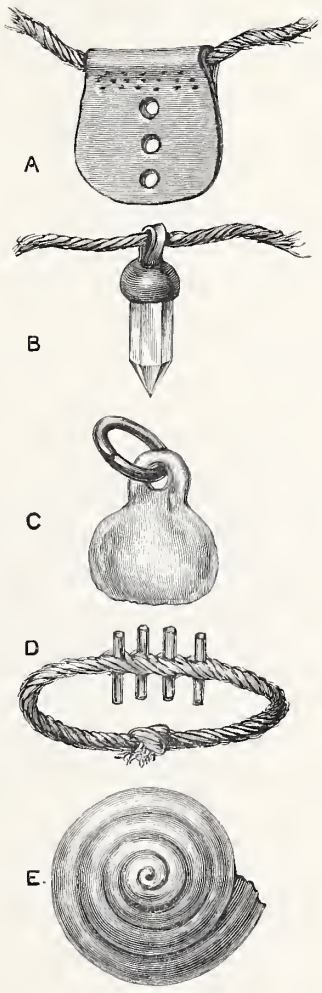
5. Six Nya-Luo beads.

6. A piece of goatskin worn to prevent chest complaints.

7. The dried beak of a chicken. He wore this on the advice of the medicine man to prevent sickness.

8. A bracelet of cord with four small sticks inserted in it. The sticks are supposed to prevent the wearer from taking harm if touched by one of his children. D.

9. Portion of a marine shell: worn as an ornament. E.



Kavirondo Charms.

10. A tiny bag of skin reputed to contain medicine for rheumatism.

Whilst I was writing these things, a clever, pretty lady came into my library. She was adorned with ornaments, bangles, and charms, although deeply and conscientiously devout. Among the ornaments the subjoined may be compared with those of the old Ja-Luo savage :—

1. A tiny locket with a design in blue enamel which was given on the occasion of her confirmation.

2. A silver medal embossed with the figure of St. Anthony of Padua. Worn with the hope that if she lost anything, this Saint would help her to regain it.

3. A pig carved out of Irish bog wood. This had a piece of its leg broken off on the very day her husband asked her hand in marriage. She still wears it "for luck."

4. A piece of turquoise supposed to come from a mastodon's tooth.

5. The key of a dispatch box suspended on a metal label impressed with the family coat of arms.

6. An image of the Virgin Mary carved in ivory.

7. A copper ring worn to cure "nerves." Bought from a pedlar in Venice. This fellow had the crural muscles and nerve prepared from a frog and laid on a zinc plate ; whenever he laid the copper ring on the plate and allowed it to touch the nerve, the muscles moved. It amused me to watch the clever way this cheap-jack gulled the men and women.

8. A whistle to call cabs.

9. A vanity case, containing a powder-puff, face powder, and a looking glass.

10. She also wore a small silk bag containing eucalyptus leaves as a protection against chicken pox.

Almost all tourists in British East Africa are interested in the ornaments worn by naked natives. It has been pointed out already (p. 120) that the ear ornaments possess tribal and social significance ; it is also clear that the apparently commonplace adornments

of these naked people are full of meaning. In pondering on the superstitions of Ethiopian savages let us not forget that palmists, soothsayers, and mystery-mongers flourish in the populous cities of Europe.

Note.—I am indebted to Mr. F. L. Henderson for the photographs of the Kavirondo villages.

Doorway in the Wall of a Kavirondo Village.

XIII

ETHIOPIAN FASHIONS IN HAIR-DRESSING

The various forms of hair-dressing adopted by the native tribes of Africa would furnish material for a monograph. The social state of an individual, as well as his tribe, is indicated by the style in which the hair is arranged. In Africa the conditions of hair-dressing are the reverse of those which prevail in civilised countries, for it is the men who affect to have their hair dressed in extravagant fashions; the women adopt the simplest of all modes, for they shave each other's scalps, the eyebrows, and other regions of the body. African women perform all the menial work of the village and have no time to spare for hair-dressing.

Among the Kikuyu men some of the styles are very elaborate. A common plan consists in rolling the hair into curls around pieces of bast. Heads treated in this way resemble the backs of a French poodle. Others imitate that adopted by the Masai warriors, in which the hair is thickly anointed with grease, especially mutton fat, and red earth. Thus a heavy shower of rain would be disagreeable; in order to meet such an emergency the men carry the dried paunch of a sheep or goat with them, and in wet weather wear it like a night-cap. When not in use, this cap, which can be folded up into a small compass, is tied round the waist. When a Kikuyu man has nothing to do he sits in the sun and plucks stray hairs out of his body with forceps with the same industry that monkeys hunt their skins for fleas.

Among the Nandi the mode of treating the hair is full of meaning. The women and children have their heads regularly shaved, but in some instances a patch of short hair is left on the crown.

The warriors let their hair grow long and plait the front locks into tags, which are allowed to hang over the forehead, like the Masai. Occasionally it is plaited into one big pig-tail behind. The Nandi also shave their eyebrows, and hair on the remainder of the body is plucked out.

They shave their heads as a sign of grief, and throw the hair after removal in special directions, or carefully hide it. Many of these silly customs remind us of the superstitions held in many English villages concerning the disposal of teeth after extraction.

A man of Kikuyu wearing a cap made out of a goat's paunch, to protect him from rain.

Among the Nandi there are special rules concerning the treatment of hair, such as shaving as a sign of mourning, and of defeat in war. It is also of significance in circumcision, and in relation to marriage and child-birth. Many of these matters have been elucidated with much care by Hollis in his useful and valuable work on the language and folk-lore of the Nandi (1909).

Some of the tribes, neighbours to the Kavirondos, dress their hair in the extraordinary style of the Suk and Turkana. The specimen I have been able to examine, thanks to the kindness of Major Powell-Cotton, belonged to a Karamojo. The hair is trained

into what is known as a "chignon" in the following way:

The youths allow the hair to grow long and rub into it grease, clay, and cow-dung which makes it felt.

A Masai wearing his hair in the form of a pig-tail drawn over his forehead. (From a photograph by F. L. Henderson.)

When a man dies the hair is cut from his head and distributed among his sons, who incorporate this legacy into their own chignons. This flattened mass of hair on some men reaches to the loin. The exterior of the chignon is ornamented with feathers, and at the extreme

end there is a curled strip of rhinoceros horn: the feathers which are used to adorn it are not stuck into the hair, but larger quills, about two inches long, are firmly fixed into the chignon to form sockets for the quills of the ornamental feathers, which can be inserted or removed as easily as a whip is placed in or removed from its socket.

In some large chignons, the margins of the hair mass are neatly turned in towards the neck, and the recess behind the fold thus produced is used sometimes as a pocket wherein the man can lodge odds and ends such as tobacco, a snuff-box, a scratcher, or the like.

These men wear a skin cape over their bare shoulders; when it rains the cape is thrown over their heads to protect the chignon. They also carry a little two-legged stool to place under the neck when they lie down: this prevents damage to the chignon.

A Nandi dandy with his hair rolled into small curls.

Reference has been made to the curved piece of rhinoceros horn at the end of the chignon. Among the Karamojo this hook-like adornment subserves an amusing purpose. "When the warriors dance and the girls

of the village look on, the warrior as he passes a certain damsel leans forward out of the dancing ring and catches her round the neck with the hook. If she

A Suk with his hair worked into the form of a flat chignon. The little stool is placed under the neck when sleeping to prevent injury to the chignon.

A Shilluk with his hair dressed in a fashion which finds favour with the dandies of his tribe, and standing like a stork on one leg.

wishes to resist she can easily break away, but this sort of identification of a girl by the dancing warrior occasions great mirth. The girls press quite closely to the dancing ring." (Cunningham.)

The Shilluks living on the west bank of the White Nile adopt a somewhat similar mode. The hair is shaved from the front part of the head, but at the back it is allowed to grow and felt in such a way that it looks at a distance as if the man had a broad-brimmed cloth hat stuck on the back of his head. Close at hand it resembles the nimbus which surrounds the head of a saint in pictures, and the felted hair like a nimbus is deficient at the nape of the neck. The Dinkas around Bor, on the east bank of the Bahr-el-Gebel, adopt a different plan, for they encourage the hair to grow long and stand on end. Some shave the scalp except a strip two inches broad along the middle of the head extending from the forehead to the nape of the neck. In this zone the hair is trained to stand on end, and, as it is often two or three inches long, produces a condition resembling the crisp horse-hair on the crest of a Grecian helmet, or, the mane of an ass.

The Dodinga dress their hair in an unusual way:— The hair is daubed with clay and made into a mass which is moulded round the head into the shape of an inverted bowl. The hair is left attached to the crown. As the hair grows, the mass loosens until it looks like a big bonnet. The chief man covers the convex surface of this mass of hair and clay with discs of leather. Each disc has an average diameter of two inches and on the leather they sew white and red beads in a spiral pattern. This extraordinary fashion of hair-dressing has been described and figured by Major Powell-Cotton. There is an excellent specimen of the Dodinga chignon in the British Museum ornamented with rows of shells.

Bleached hair is a favourite fashion with some of the Somali dandies. This alteration in colour is produced by plastering the hair with quicklime. The lime

is obtained by pounding and burning the shells of large molluscs.

A head-dress in the fashion of the Dodinga. Kauri shells are worked into the hair. (British Museum.)

A fantastic method of arranging the hair prevails among the Mashukulumbi, a tribe living along the Kafue river (Rhodesia). Selous travelled in this

district (1888) and described the men. They go naked, not from necessity, for they have large herds of cattle and hides, but it is the fashion among them. Some of the Mashukulumbi have their hair, as well as that removed from the heads of their wives, worked into a tall cone two and a half feet high. The base of the cone is fixed to the back of the head, and made to curve forwards so that its apex is straight above the head, and to it a strip from the horn of a sable antelope is fixed. This strip of horn is strong enough to stand upright, yet waves with every movement of the head. A cone of hair and horn sometimes measures five feet in height. In building these cones the hair is made to felt with grease, and as it cannot be washed when once worked up in this way, soon swarms with vermin. A metallic stylet is stuck in the tuft to serve as a scratcher when the vermin are too active.

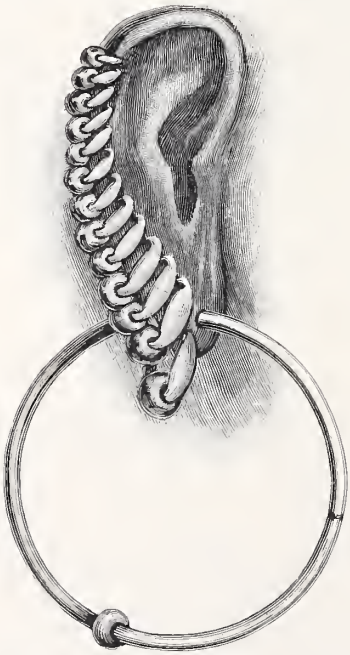
The head of a Mashukulumbi with a fantastic chignon fifty inches high. The cone is formed of hair and the terminal section is a strip of horn from the sable antelope. (From a specimen kindly lent by Mr. F. C. Selous.)

Selous shrewdly remarks that men with hair dressed in this way must necessarily live in an open country; they never could get through bush. I have had an opportunity of examining two of these cones from Mr. Selous's museum. Mr. Long, who recently visited the Mashukulumbi, informed me that this odd

practice of arranging the hair is dying out because the neighbouring tribes laugh so much at their grotesque appearance. The fact that this fashion is disappearing induced me to mention it in this book. Dr. Holub visited the Mashukulumbi country 1883–1887 and published an interesting account of the natives. His book contains numerous figures of their curious chignons.

The scalp of a Ja-luo man with a pattern shaved upon it. (After Hobley.)

A singular method of shaving the head prevails among the Ja-luo. If a man kills an enemy in war, in order to propitiate the spirit of the dead man, the slayer shaves his head for three days on returning to the village. The men also shave their heads in curious patterns.



The ear of a Ja-luo chief ornamented with rings bearing beads.

The Ja-luo ornament their ears in a peculiar way. They insert a number of rings along the helix, sometimes as many as fifteen may be counted in one ear. The rings bear a small bead known as Nya-luo; the majority are blue. They differ from the usual trade article. The natives state that they find them in the Maragolia Hills after a heavy thunderstorm; they

believe the beads descend with the rain. These special beads have attracted much attention since Mr. Hobley described them. It is extremely probable that they found their way up the Nile, for Mr. Hobley saw in the British Museum blue, yellow, and jasper beads, identical in appearance to the Nya-luo beads, from Ancient Egypt and some buried cities in Beluchistan.

References.

Cunningham, J. F. ... *Uganda and its Peoples.* London, 1904.

Hobley, C. W. ... Anthropological Studies in Kavirondo and Nandi. *The Journal of the Anthropological Institute of Great Britain and Ireland,* 1903, p. 325.

„ *Eastern Uganda. An Ethnological Survey. Ibid.,* 1902, p. 26.

Powell-Cotton, P. H. G. *In Unknown Africa.* London, 1904.

Selous, F. C. ... ... *Travel and Adventure in Africa.* London, 1903.

Holub, E. ... ... *Von der Capstadt ins Land der Mashukulumbe.* Wien, 1890.

XIV

ON SAFARI—AN EAST AFRICAN PHRASE SIGNIFYING A CARAVAN JOURNEY

Apart from the Uganda Railway roads do not exist in Eastern Ethiopia: there are tracks made by the bare feet of the natives, Swahili porters, and by cattle. The native tracks from village to village or to distant districts only permit the passage of man and beast. Wheeled vehicles for travelling purposes are non-existent. It is impossible to use horses on account of tsetse flies and ticks.

A wheel in the Rift Valley was formerly as big a novelty as a polar bear would be on the Victoria Nyanza. The pack animals for a long journey are Swahili porters. Consequently, in the days before the construction of the railway, a journey to distant parts of the country was, and in many instances still is, a serious business. The traveller must take with him not only food, and often water, changes of raiment and other personal effects, but also tents, bedding, cooks, cooking-pans, and other requisites for preparing food; the quantity and character of the supplies will be regulated by the size and length of time occupied by the journey.

When the safari is run for trading purposes, material for bartering with the natives must be carried; for example, beads and coloured cotton goods; iron, brass, copper-wire, and things useful to the natives, and for which in return they will be willing to give food, tusks, and hides. East African natives are no longer sold into

bondage, but in past years slaves were important articles of trade.

A safari is often organised for hunting purposes: then, in addition to the hunter, it will include native trackers, gunbearers, skinners, and men to assist in finding game, to drive it to the hunter if necessary, to follow it when wounded and act as retrievers when it is shot. In fact the trained natives take the place of sporting dogs in Europe, but they are more useful as they bear guns and carry the quarry to camp. These men also skin the animals and birds, and some are able to prepare the hides and skins for preservation.

Sometimes a safari will be run merely for pleasure, much in the same way as a camping party or a picnic may be arranged in England, but there is no wayside or general store to furnish eggs, butter, milk, or bread when the caravan runs short of food. The chief object of concern to the headman is water, and in moving camp from one place to another, it is a prime necessity to select a spot where water exists. The length of a day's journey when "on safari" is invariably determined by the locality of water holes and rivers. Every safari or caravan is armed, for in Eastern Ethiopia travellers are liable to be attacked by natives. Firearms are also required for protection against wild beasts, as well as to provide food for the porters.

One of the objects of my visit was to obtain first-hand some knowledge of the country, the natives, the beasts, the birds, and the trees; therefore the safari was arranged to meet these intentions. It consisted of Dr. Comyns Berkeley, Mr. H. F. Henderson, and myself; two white hunters and my servant, accompanied by a headman and eighty natives. The composite character of this crowd may be inferred from the following list:—

The headman and the gunbearers were Somalis: the tracker was an Ndorobo, the cook a Goanese, and the skinner a Kikuyu man: the table boys and the syce

were Wakamba: the three camp policemen (or Waaskari) and the stable boys we employed for the mules were Kavirondos, and some fifty or sixty Swahili porters carried the loads.

The Swahili porter is the pack animal of East Africa and he carries the load upon his head. The average load for a porter is 60 pounds, and he will carry it 10—15 miles a day without complaint over grass plains, through scrub, marshes or forest regions. The porter walks with bare feet; he may often be seen, with the load on his head, pick up a stick, a cigarette, or some similar trifle from the ground, with his toes.

It is a fashion in some parts of England to allow children to run about with bare feet. The chief drawback to this custom in civilised communities is the frequency with which the skin on the under surface of the big toe and the ball of the foot is cut with glass. The chief enemy of the barefooted porter when walking through the forest and scrub is the long, strong and sharp thorns which lie about the tracks. It is quite common when the caravan is on the move to come across a porter sitting by the side of the track endeavouring to extract a thorn from his foot.

As soon as the porters arrive at the place selected for the camp the loads are quickly dropped. One set of men fix up the tents; others obtain wood from the neighbouring forest; the cook and his staff make a fire, and when the boys return with water the kettle soon boils and efforts are made to prepare the meal.

The boys in charge of the "chop" boxes arrange the table, and when things go well, by the time the sun slips behind the rim of the world for the night, the camp fires are lighted to warm men's bodies and to scare away marauding beasts. A good appetite is the best sauce and dispels squeamishness: the dinner is a funny meal to those accustomed to the luxurious restaurants and hotels of large cities, but after a long walk and when thoroughly tired from hunting and

exertion in the fresh air the food is eaten with fun and often with relish.

In due course a survey is made of the camp to see that the fires are blazing brightly and that there is a sufficient supply of wood: the askari comes on duty armed with his rifle: the openings of the tents are fastened, and, tired with the day's exertions, all sleep soundly in spite of the screeching of hyænas, the occasional grunting of a hungry lion, or the regular snoring of a companion deep in sleep in an adjacent tent.

We had some interesting days whilst on safari, and in order to give the reader some idea how the time was spent a typical day will be described. For the first few days everything seemed wild and strange, but we did our best to be contented with the new situation. We started at Molo with the hope of obtaining a buffalo and then moved down to Njaro and finally reached Lake Nakuru.

As soon as the sun began to "decorate the morning sky," which is the picturesque Masai phrase for the dawn, the tents were opened, and we bathed, shaved, dressed, and had breakfast. One evening we were obliged to camp at a place where there was no water: when my servant awoke me in the morning, he informed me that the getting up would be a very simple affair, for there would be no bathing, washing, or shaving.

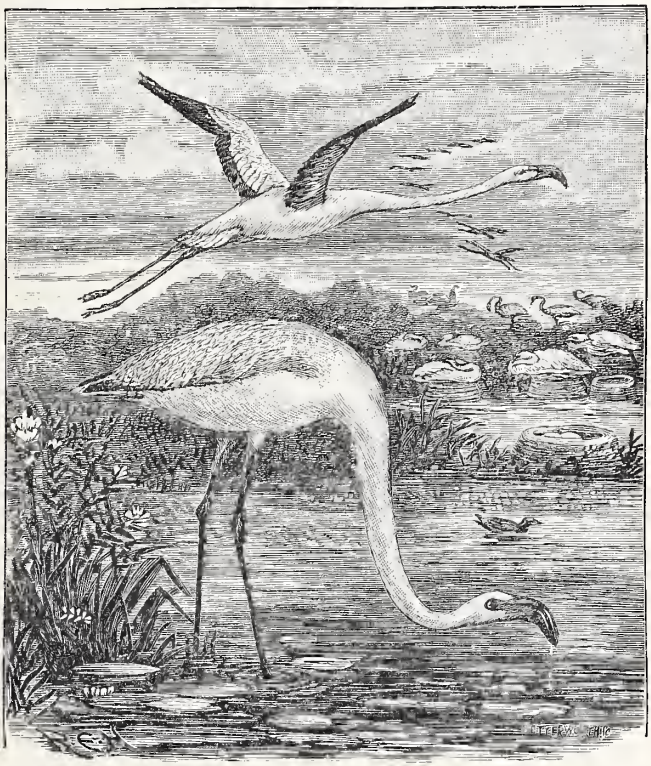
As soon as breakfast was over, we mounted our mules and went off with the hunter, tracker, gunbearer, and boys. We had rifles, shot guns, and field glasses. Our most delightful hunting ground was the neighbourhood of Lake Nakuru. We made our way carefully through long grass to the north-west corner of the lake and descended the steep and precipitous rocks which exist on this side to the lake shore. Among these rocks we found the graceful Reed-buck and succeeded in obtaining some excellent specimens. On reaching the edge of the water we made our way to the northern

end, which has a sandy shore bordered with thick reed-beds, interrupted here and there with hippopotamus tracks. Behind these reed-beds there are dense thickets of thorn trees and spaces covered with green grass around the spot where the river flows into the lake. Here we were able to satisfy ourselves of the nature and variety of the animal life occupying this dense thicket around the mouth of the river, for the soft sandy ooze

Among the rocks we found many reed-buck and succeeded in obtaining some good heads.

was covered with traeings more thickly than the columns of the great temple at Thebes, and they were easier to read. Here were the marks of innumerable birds' feet:—wading birds, duck, goose, ibis, and the pink feathers and bones of the flamingo. Among these footmarks by the edge of, and leading into the reed-beds, were the huge footprints of the hippopotamus, large enough when filled with water to serve

as a bath for a baby. In many places, in contrast to such huge depressions, were the clear-cut impressions made by the hoofs of the water-buck. Whilst we were discussing them I happened to look across the reed-beds, and within thirty yards of us there stood two of these



The Flamingo.

beautiful beasts—male and female—watching us between the trees, and as motionless as if they formed part of the thicket. These antelopes stood quite still as long as we were simply content to watch them, but the instant the gunbearer moved to hand me a rifle they were off like the wind. Proceeding along the shore we

saw the recent footmarks of a lion ; this warned us not to visit the lake unarmed.

One morning the lake was visited by an enormous flock of flamingoes. We gradually crept along the edge of the reed-bed to obtain a good view of them. The birds were so numerous that they covered about an acre of the lake. On approaching them a few took wing, and as each rose in the air it had the clumsy appearance of an aeroplane. Suddenly a gun was fired;

The Head of a Wart-Hog.
This is the ugliest mammal in Ethiopia.

this huge flock of birds rose on the wing and the rustling noise made by the flapping of their huge wings reminded me of wind suddenly striking and rushing through the tall trees of a forest : "And when they went I heard the noise of their wings, like the noise of great waters" (Ezek., chap. i. 24). The feast of colour, the magnificent cloud of rose pink which covered the lake as these birds sailed across it, defies description.

Towards midday we returned to the camp for shelter from the heat and to obtain rest and lunch, where we remained until four o'clock, and after refreshing ourselves with tea, sallied forth again. We succeeded in shooting the rock rabbit (hyrax or coney) which lived in great numbers among the rocks near the camp, wart-hogs, guinea fowls, and a lesser bustard. The birds were welcome additions to our larder. The wart-hogs afforded us some fun. The tracker caught sight of two hogs in the long grass; they were standing side by side in such a way that the snout of one hog was towards the tail of the other. One of the party fired a rifle at them with the intention of securing the two animals with one bullet. The Somali proverb, "to aim is not to hit," applied here, for the bullet grazed the snout of one hog and the buttocks of the other, and so irritated both, that when the boys went to hunt them out of the long grass they were chased by the hogs. The Somalis kept close to the guns, and as the angry animals persisted in following the boys, it became necessary to shoot both hogs.

It is dangerous to hunt big animals in long grass, especially when they are wounded: records of lion, buffalo, and rhinoceros shooting are eloquent in this direction. In order to show how completely big animals may be concealed in long grass, I may mention that on one occasion a topi (*Damaliscus jimele*) was shot on a slope covered with tall grass: we left a boy to skin it whilst we returned to the camp for carriers to bring in the meat and hide. On returning to the spot where the antelope was being flayed, I could not see the boys or the topi, fifteen yards away, although I was on the back of a mule.

On one occasion whilst moving through long grass after a herd of impalla, one of the most beautiful and graceful of all the antelope family, we heard the crack of rifles in a neighbouring forest where we knew our friends had gone for buffaloes; we

quickly left the grass land and sought the society of trees in order to avoid the rush of the stampeding herd. The animals passed within 200 yards, but the grass was so high that it concealed us. On this occasion the clever way in which a herd of buffalo directed by Mowghli effected the destruction of the tiger, Shere Khan, as related by Kipling in the absorbing *Jungle*

The Impalla. *Epyceros melampus*.
One of the most graceful of the antelope family. This gazelle abounds in the Rift Valley.

Book, came forcibly to my mind. None of us was anxious to be trampled to death. A friend related to me a story in which an Ndorobo, whilst hunting a buffalo, was attacked and so crushed by the angry brute that the remains could only be recognised as those of a man by the fact that one of the hunter's feet stuck out of the mangled mass.

There are interesting eats in East Africa besides lions, leopards, and cheetahs. Whilst in the Rift Valley we had opportunities of seeing the Serval Cat. It is a pretty but untamable animal and very destructive to poultry. A settler hearing a noise in his fowl-house one evening sent a lad to see that the birds were safe and not disturbed by eats. The boy returned to say that he had made them safe by shutting and

The Serval Cat.
Pretty but fierce and untamable, and very destructive to poultry.

fastening the door of the fowlhouse. In the morning twenty out of twenty-three birds lay dead and a Serval Cat sat on the cross beam. The boy had shut the animal in with the birds.

The kittens of the Serval Cat are ferocious little brutes; they scratch and bite vehemently. We saw a native in charge of one at Njoro, and the skin of his belly was freely cross-hatched by the claws of the pretty

but fierce kitten in his charge. This uncheeked scratching seemed to distress him very little.

We were bound to shoot a number of animals in order to supply our camp with meat. Porters when on safari are supplied with flour made from mealies, and they expect meat. When an opportunity offers these men will eat a very large quantity of flesh, and if the porters be kept well supplied with meat they are contented, happy, and not so likely to desert the camp.

Certain precautions are necessary in regard to the religious prejudices of the Mahomedans. The Somali gunbearers carry a large sheath knife in their belts for skinning animals when shot. When an antelope, zebra, or buffalo is shot and it is safe to approach, the Somali runs up with the object of cutting the animal's throat before it dies: in such circumstances the Mahomedans will eat the flesh. Should the animal cease to breathe before the throat is cut by a Mahomedan, none will eat the flesh, but he will flay and disembowel the animal for such of the natives who, not being followers of Mahomet, may choose to use it.

The high grass which abounds in the Rift Valley is the favourite haunt of the rhinoceros. This mammal, like the elephant, is a huge, ungainly representative of a giant fauna which was formerly common on the earth. So numerous are the rhinoceroses in some parts of East Africa that they are a nuisance to caravans. Gregory, when making a journey near Baringo, had to pass through scrub and thorny thickets. His porters were charged several times in one day by these colossal animals. He writes: — They lay asleep, until awakened by the noise we made, and then, frightened and muddled, they charged wildly in all directions through the scrub. These things happened in 1893.

Harvesting-Ants.— During our journey from Njaro

to Lake Nakuru, the grass over a large part of the country had been set on fire, and in many directions it was burning briskly. In the districts traversed by our porters several elliptical areas of plain soil among the blackened grass attracted my attention. These patches measured in most instances three yards in the major and two in the minor axis: they were sunk slightly below the level of the surrounding ground and were as free from grass as a newly-polished tombstone, and the surface was as smooth as if it had been finished by a plasterer's trowel. In the first instance I was interested in these smooth patches because on many of them we found game tracks, such as footprints of the impalla, water-buck, hartebeest (kongoni), or the rhinoceros. These footprints stood out as plainly as the imprints of a hare, polecat, or rat on snow-covered ground.

On examining the bare patches more carefully, I found two or three circular holes surrounded by a ridge of dust, an inch high, from which brown ants issued; near the edge of the patch there was a heap of husks, and on examining them they proved to be the husks of many varieties of grass seeds. When the patch was situated in an area where the grass had been closely burnt it was easy to make out ant-paths radiating in many directions from the clear area, and the ants laden with seed could be seen travelling along them. I have re-read carefully Moggridge's description of harvesting-ants; I have no doubt that these elliptical patches of grass-free ground are due to the energy of some species of these interesting and industrious insects. The smooth appearance of the patch is due to the persistent traffic of multitudes of these small insects.

It is curious that the grass and other seeds in these underground granaries do not germinate. No satisfactory explanation has yet been advanced to account for this fact, and I have no theory to offer. These elliptical ant-grounds were numerous in the grass land around Lake Nakuru. They were clear of small stones,

twigs, leaves and grass, and were fairly uniform in size.

The lake had an irresistible attraction for us, and in whichever direction the party started it always found its way round to some part of the lake shore. It was always instructive and often of absorbing interest to watch the birds in the thickets, the wading birds in the

The Silent Lake, the home of the hippopotamus.
The birds are the sacred Ibis.

water, and in the cool of the afternoon the school of hippopotamuses in the lake. These huge animals cautiously approached the shore for the purpose of reaching the rich green grass which grew so luxuriantly along the banks of the terminal section of the river: then they would slowly raise their huge heads, which look like logs of wood floating on the surface of the

water, survey the landing place, and open their mouths as if yawning at being kept waiting for their meal of grass.

On one occasion we stayed so long by the lake that darkness came on before we reached the camping ground: those in charge were anxious on our account and fired a warning gun, to which we replied, and were thankful for the guidance of a lamp which the askari had fixed in a tree.

The kitten of the Serval Cat, though pretty, is a ferocious little brute; it scratches and bites vehemently.

XV

AN UNCAGED ZOO

In London—indeed, in all large towns possessing a well-stocked menagerie—it is a favourite form of enjoyment, and certainly one full of instruction, to pass a few hours on a fine Sunday watching the birds, beasts, and reptiles in their cages. The majority of civilised human beings are fond of animals, and it may be truly written that those who are fond of animals rarely lack friends. In many parts of Eastern Ethiopia, beasts, birds, reptiles, and insects are so abundant that the country has been described, and not undeservedly, as an uncaged Zoo, and I will describe in this chapter how we spent a Sunday in it.

There are certain inconveniences attendant on walking among uncaged animals. Some mammals prefer certain localities: this is especially the case with antelopes. The kudu and the oryx are found around Lake Baringo, but are rarely seen in the neighbourhood of Lake Nakuru. Even Grant's gazelles vary in small particulars in different parts of the country. Moreover, the herds of game are always on the move; they may abound in one district for a few weeks or months, and then, for reasons which to us are obscure, move away to some distant place.

In order to see all the animals in this uncaged Zoo, the visitor must travel sometimes great distances, endure much fatigue, often hardship, and exhibit patience in its best form. In wandering about he must also use eyes and ears to find the animals, and when

found they are not labelled. It is not easy to recognise animals on a plain covered with tall, dry, yellow grass and boulders of black rock, for under such conditions the yellow skins of lions and hyænas look much alike. Before leaving camp we fed the kites and buzzards. These birds are real scavengers and pick up offal and fragments of meat about the camp. Some years ago in India I occasionally amused myself by throwing pieces of meat and liver high in the air in order to attract the keen-sighted kites. One of the birds would fly swiftly and catch the meat with its talons before it could reach the ground. The visual acuteness of these birds is wonderful, for I often tried to deceive them by throwing a potato or a small bread-roll into the air, alternately with the meat, but never succeeded. The rapidity with which the kites in the neighbourhood realised that feeding was in progress is remarkable, for within a few minutes after the game began, the birds became so numerous that the feeder would be surrounded by a living vortex of kites. An amusing practical joke is played by the Indian boys on the kite by spreading a blanket on the ground and laying a piece of meat upon it; the bird attempts to seize the meat and its sharp claws penetrate the blanket; whilst thus entangled the boys throw the blanket over it. It is contrary to their religious principles to kill these useful scavengers, so they are contented with pulling out a few feathers and setting the bird at liberty. Some fun is also obtained when the kites are flying around by placing a piece of meat on the turban of an onlooker; suddenly the kite swoops, and whilst seizing the meat the claws become entangled in the turban; the surprise of the man is great when he sees his turban sailing through the air. There is indeed a substantial basis for the method in which Sinbad the Sailor was transported by the Roc.

In India, where the kitchen is at some distance from the house, it is no uncommon thing for a watchful kite

to appropriate a roasted fowl or joint during its transfer from the kitchen to the dining-room. On one occasion whilst I was lunching out of doors near Jeypore, a predaceous kite swooped over the table and flew away with the roasted fowl, the only substantial element in the meal.

English visitors in eastern lands usually take much interest in kites. Four or five hundred years ago these birds were nearly as common in London as they are to-day in Cairo. One writer of that period (Turner) states that they were so rapacious as to snatch meat from the hands of children in our towns and cities. The toy known as the kite takes its name from these birds.

There is a Masai proverb which runs, "Do not show the hawk your bow or he will fly away." A beautiful hawk sat on a dead branch high in the tree watching our party proceeding to the lake. We stayed beneath the tree and it was decided to obtain the hawk for a specimen. The instant the gun was handed to me by the gun-bearer the bird flew away. This happened on several occasions and I am sure hawks are as knowing as rooks in regard to guns.

It is the practice of many settlers on the high grass plateaus around the Kikuyu and the Mau escarpments, as well as in the Rift Valley, to fire the long dry grass. This method destroys young trees as well as ticks; such grass-fires sometimes get out of hand and destroy out-buildings as well as settlers' houses. On two occasions we were afraid that the fire would involve our camp in destruction. When the coarse dry grass is burnt off just before the rain is due, in a short time young green grass makes its appearance and is visited by zebras, antelopes, and similar animals.

As soon as the grass is burnt, the blackened area left by the fire is visited by large birds such as hawks, kites, secretary birds, and bustards: they hunt for little birds, grasshoppers, locusts, and other winged insects which, being singed by the fire, are unable to fly.

The great black and white bustard (*Eupodotis kori*), when disturbed, has a curious way of flying around in concentric circles. When alarmed bustards rise clumsily on the wing and make a wide circuit before alighting, but if followed up, the birds make a narrower circuit and so on until they finally alight near the spot from which they were originally disturbed. Taking advantage of this fact, we were able, without much trouble, to secure some of these large birds for our larder. When roasted the flesh of a bustard is as delectable as that of a turkey. These large birds weigh more than twenty pounds, and examples have been recorded which weighed twenty-five pounds. Such birds will have an expanse of wing measuring eight feet in width. There is a smaller species of bustard which we obtained at Njaro.

I was very interested in the bustard because two species formerly lived in England. The Great Bustard (*Otis tarda*) only became extinct in Norfolk about 1838. The smaller bustard (*Otis tetrax*) occasionally straggles to our shores. The museum at Salisbury contains two stuffed specimens of the Great Bustard, said to be the last examples of this bird shot on Salisbury Plain. When the gizzards were opened they contained, among other stones, some flint arrow heads.

I have seen the Great Bustard stalking about the fields in the south-west of Spain, near Utrera. These birds eat berries, seed, larvæ, molluses, frogs, young corn, and juicy plants. A live frog swallowed by a bustard must have an uncomfortable time among the stones in this bird's gizzard. Imagine the agony of being slowly ground to death in a gizzard-mill.

The Bee-eaters, with their wonderful coloration, graceful forms, and activity, could not fail to attract the attention of the least observant. It was delightful to watch one sitting on the twigs of a leafless tree, and then see it suddenly dart in the air and snap an insect on the wing, like a flycatcher, and return to the bush

again. Bee-eaters are easy birds to watch, for they are not shy, and allow a close approach. Their colours are best displayed when the bird is on the wing. The Nubian Bee-eater is famous for its crimson plumage. When flying in the sun it is a brilliant object, but after death the colour rapidly fades. No one can realise the splendour of this bird from a prepared skin. Bee-eaters are very common in Ethiopia, and are often seen in flocks.

The ground between our camp and the narrow belt of green grass, reeds, and thorn trees fringing the lake was covered with tall dry grass in many places four feet high. When grass is tall and grows uniformly over the ground, walking through it is tiresome. Often it grows in small tussocks, and appears to form rows much like wheat when sown with a drill; in this case the mules find their way easily through it. The ground was soft, sandy, and full of holes, some of them very big. The large holes were excavated by wart-hogs, and by an animal odd in shape, grotesque in appearance, with a name to match, *Orycteropus*. This funny animal digs holes in the sand with its feet, as its Greek name implies. The settlers call it the antbear. The Dutch settlers in Cape Colony many years ago named it aard-vark, or earth-pig, but it belongs to the same group as the ant-eaters. This animal feeds on ants; it is harmless, timid, nocturnal in habits, and its teeth have sorely puzzled anatomists on account of their peculiar shape. The hole made by the aard-vark is too small to accommodate the wart-hog, and in order to save himself trouble the hog appropriates a hole already excavated by his neighbour, and enlarges it to suit himself. The wart-hog is a lazy fellow, and only digs a hole just big enough to lodge his body; as he cannot turn round in the hole, he must enter it tail first. A large number of the holes are unoccupied, for wart-hogs often change their residence. It is easy to know which holes are "to let," for as soon

as a hole is deserted, a spider spins its web across the entrance, then flies, attracted by the odour left by the pigs, are caught in this net, and so the cunning spinner thrives.

The settlers like sportsmen to shoot the wart-hogs, for the holes they make in the ground are uncomfortable and awkward places for the feet and legs of men, horses, mules, and cattle. The hog's flesh some men find palatable, but it is tough to eat; moreover, it is useless

The Earth Pig, Aard-vark, or Antbear.

for the porters, as many of these men are Mahomedans and refuse to eat it on religious grounds.

These pigs are named wart-hogs on account of the fleshy prominences on their faces. They are ugly, repulsive-looking creatures, and when irritated can inflict nasty and even dangerous wounds with their tusks. The wart-hog is very common in the grass lands around the lake. The natives are glad to obtain the tusks; they use them as ornaments when in full dress.

On the way to the lake, whilst following the winding course of the river, a sing-sing or Defassa waterbuck was shot; the bullet broke its spine near the sacrum and paralysed the animal's hindquarters. As we approached the wounded buck it raised its head, which was ornamented with a pair of horns thirty inches long, and snorted defiance at us. Some successful photographs were taken of the noble animal, and then it was

The Sing-Sing or Defassa Waterbuck.

killed by a bullet through the heart. When the animal was being flayed the skinner found a Snider rifle bullet embedded in its flank; it must have been in the animal's body many months. Poor beast, it could not escape its fate, but it was a welcome addition to the camp larder, for though the meat is tough the porters find it palatable.

During the process of skinning and disembowelling the vultures and kites were flying in circles overhead,

ready to pick up any fragments that might be left on the ground; they obtained very few, for the native is very fond of the viscera, especially the paunch and the soft fat which forms the omentum and fills the mesentery.

Conspicuous coloration of animals has been the favourite theme of many naturalists. No one should argue on such matters from observations made in a menagerie or a museum. It is difficult to imagine a more conspicuously coloured mammal than a zebra. The large black and white stripes seemed specially designed to betray it. On one occasion as we were proceeding to the lake the tracker gave us the sign to dismount, and pointed out some shadowy forms grazing quietly under a conical grass-covered hill. "Ngombe" (cattle) said the hunter. We moved a hundred yards closer, looked at them again through the field glass, and then realised that it was a herd of zebra. Many times whilst wandering about this extraordinary Rift Valley or watching from the train in the late afternoon, I have been surprised at the peculiar shadowy tint assumed by these brilliantly striped animals when standing against a forest or some tall bluff as a background.

It is worth remembering that some of the beautifully coloured fish which live in the waters around coral islands are striped, and when they assume tints which make them inconspicuous the colour becomes diffuse; thus they can assume a striped or a diffused coloration apparently at will. The shadow-like tint of the zebra in the fading daylight is an optical illusion.

When Joseph Thomson traversed Masailand in 1883 he met zebras in thousands, and writes:—"It was a magnificent sight to watch these beautiful animals thundering along in great squadrons; here stretching out like racers as they passed in dangerous proximity to the enemy; there massed up at bay with excited mien and head erect, trotting about with splendid action as if daring the hunter to approach."

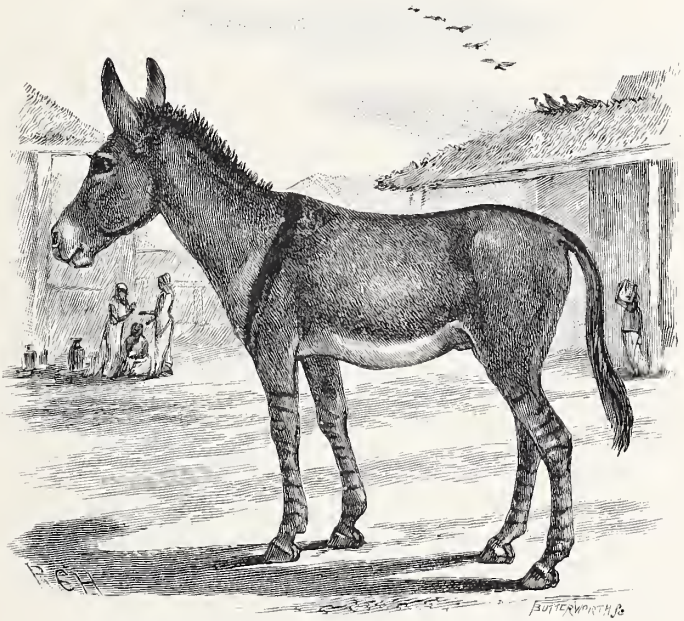
Zebras are purely African beasts, and in British East Africa as common as hartebeests. They are among the first wild animals seen from the train after leaving Mombasa. It is almost unnecessary to write anything about these conspicuous quadrupeds, which combine some of the characters of horses and asses.

The mane of a zebra, like that of an ass, is erect; the

Grant's Zebra.
Common in the Rift Valley, but it will disappear before the march of civilisation.

upper part of the tail is free from long hairs, and "chestnuts" are absent from the hind limbs. Zebras are fertile with horses and asses, and hybrids have been obtained. Attempts have been made to utilise zebras and zebra-hybrids, but without success, for they lack the strength and endurance of horses, ponies, asses, or mules. It is well-known that the ass has transverse

stripes on its legs, like those on the legs of the zebra. These are well shown on the ass represented below. It cannot be seriously contended on this account that asses have been derived from zebra ancestors. No one has seen an ass with a face, ears, and tail like a zebra. These leg-markings have interested me much, because they are often very numerous in asses and mules bred



An Ass, showing numerous cross stripes on the legs.
(*Photograph by J. B. Christopherson.*)

in Somaliland. Mr. Christopherson informs me that in the Berber Province where there are wild asses, it is the practice to tether the she-asses away from the villages in order that they may become impregnated by wild asses. The cross stripes on the legs is a feature of the Somali wild ass, and the reputed cause of the shoulder stripe is known to all Christians.

Zebras are, in a sense, a pest; wandering over the plain, they break down fences and trample over cultivated areas. They are good friends with ostriches, hartebeests, and Thomson's gazelles. The hartebeests are the friends and guides of zebras, and the latter never neglect the sentinel's signal of alarm.

Zebras will disappear before the march of civilisation; the lion takes a heavy toll of them, but the settler is the bigger foe. In the grass land around Nakuru we saw their skeletons in abundance picked clean by vultures and bleached by sun and weather.

The presence of so many zebra skeletons in the grass-covered crater-like depressions around Nakuru recalled to my mind a fact often referred to by geologists, namely, the great accumulation of mammalian bones in a limited area. Sometimes the bones are those of the same species of vertebrate animal, or they may be a mixture of incongruous species. Several explanations have been advanced to account for such local collections of skeletons.

Darwin, in his delightful account of the voyage of the *Beagle* refers to this in regard to the Guanaco, for he writes that they have particular spots for lying down to die, and that in certain circumscribed spots on the banks of the St. Cruz river the ground was actually white with bones. He particularly examined the bones and points out that they were not gnawed or broken. He came to the conclusion that "the animals in most cases must have crawled, before dying, beneath and amongst the bushes." Darwin also mentions that at St. Jago in the Cape de Verd Islands he found, in a ravine, a retired corner covered with bones of the goat, and exclaimed that it was the burial ground of all goats in the island.

It appears that the Swahili traders believe in natural "animal cemeteries"; Major Powell-Cotton describes one which he visited near Mount Zunut in the Toposa Country. He was surprised to find the whole

country-side glistening with elephant bones. His guide assured him that it was "the place where elephants come to die." This particular place was well known to the Turkana, who regularly visited it to carry off the tusks.

There are several modes in which mammalian remains may accumulate under alluvial deposits. Gregory, in describing the geology of the Rift Valley, found around water-holes acres of ground white with bones of the rhinoceros, zebra, gazelle and antelope, jackal, and hyæna, and among them the remains of a lion. All the bones of the skeletons were there fresh and ungnawed. The year before, a drought had cleared both game and people from the district. Those animals which did not migrate crowded around the dwindling pools and fought for the last drop of water. "These accumulations were therefore due to drought and not to deluge."

The manner in which animals accumulate in these grassy valleys is remarkable. Sometimes the gazelles are so numerous and so crowded that a valley appears of a sandy yellow.

Sudden catastrophes account for the wholesale destruction of animals, and a good example of this must be familiar to all who have visited the excellent Natural History Museum at Brussels, and seen the extraordinary collection of huge skeletons of the Iguanodons, which were found in a fault in the colliery of Bernissart, one thousand feet below the present sea-level.

In the last decade of the nineteenth century, East and South Africa were visited with rinderpest which destroyed buffalo and cattle; kudus, gnus, and giraffes also suffered badly. This is interesting as showing that disease aids in exterminating mammals, but does not destroy a whole fauna of a country. It limits itself to certain species.

Many of the Ethiopian game animals are of large size, and those who have only seen them when stuffed

in a museum, or alive in a menagerie-paddock, might imagine them easy to shoot. All wild animals are watchful, quick to take alarm, and antelopes especially can move from place to place with great rapidity. When feeding on grassy plains they are extremely difficult to approach nearer than 200 or 250 yards. Alert animals of this kind, surrounded as they are by predacious beasts and hunters, soon appreciate danger. Every event around them they appreciate with quickness: even the noises and movement of birds are to them warning sounds and notes of alarm. We realised this when hunting, for whilst carefully stalking antelopes and slowly creeping through the grass, taking advantage of any slight rise or hillock, a hare would get up and run away, making, every few yards, curious bounds or jumps, or a noisy bird, especially the black-winged plover, would fly and shriek; then every head in the herd is raised, and the animals would be off. Schillings, in reference to the harsh cries of black-winged plovers alarming game, calls them "the police of the wilderness in feathered uniforms."

On one occasion, when carefully creeping into a thicket to get a careful and favourable shot at a herd of zebra, I heard a tremendous cackling and saw around me about fifty guinea-fowl, flapping their wings and screaming with their tails up, like turkeys in a farm-yard. It amused me very much, but alarmed the zebras and they were soon out of sight over a ridge.

The oxpecker, or "tick-bird," is useful to the rhinoceros and the buffalo. All the mammals are infested with ticks, which crowd on the bare spaces of their bodies. It is not uncommon to see ten or twenty of these birds on a rhinoceros, kudu, or buffalo, busily engaged in picking parasites: on the approach of the hunter they quickly give a note of alarm. The oxpecker is closely allied to the starling, which performs the same useful purpose for cattle and sheep in the British Isles.

When tick-picking the oxpecker rests on the whole tarsus and when in danger of being swept off by the tail of its host flattens itself or hops out of the way. It is stated that an oxpecker will attach itself to a particular animal.

The oxpecker will pick parasites from oxen and is exceptionally fond of donkeys. White herons will perch

Oxpeckers (*Buphaga erythrorhyncha*).
Busy on submerged buffaloes.

on the back of cattle and feed on ticks, flies, and other parasitic insects. When elephants approach water, buff-backed herons will swarm on their backs.

Close to our camping ground near the lake there was an almost vertical wall of rock, about 300 feet high, which formed one of the many irregular boundaries surrounding the deep depression which this

lake occupies. The face of this rampart-like wall was overgrown with grass, but there were many ledges and rocky platforms jutting from it, forming admirable playgrounds for a curious animal often termed the rock-rabbit. It runs about the rocks with facility, popping in and out like Punch or Judy, or sitting on its hind-quarters like a marmot. One was shot and brought to me; I immediately recognised it as the Hyrax or coney: its common name among the settlers is pronounced and usually written "dassie." The hyrax is especially interesting because it is a puzzle to zoologists. In appearance it is like a rabbit, but when it is more carefully examined four fingers will be found on the front limbs and three toes on the hind. The nails on the toes are more like hoofs than claws, and the soles are fleshy; these fleshy parts extend beyond the hoofs in front and are abundantly supplied with sweat glands. This peculiar condition of the feet enables it to cling to the rocks much in the same way as the gecko's feet enable it to run across a ceiling.

Zoologists find it best, although the hyrax possesses many features which are found among ungulate animals, to let it form a sub-order, *Hyracoidea*, of the great Order *Ungulata*, which contains the elephant, rhinoceros, oxen, giraffe, and antelopes. The teeth of the hyrax differ from those of the rabbit; its molar or grinding-teeth display a pattern on their crowns very like that seen on the corresponding teeth of the rhinoceros. The classifiers cannot quite agree on the generic name of this animal; some would call it Hyrax and some Procavia.

The coney is widely distributed in Africa and is found in some parts of Arabia and Palestine. The occurrence of this animal in Palestine is interesting because the first mention of it occurs in the Pentateuch: "Nevertheless these ye shall not eat of them that chew the cud, or of them that divide the cloven hoof; as the camel, and the hare, and the coney: for they

chew the cud but divide not the hoof; therefore they are unclean unto you" (Deut. xiv. 7; also Lev. xi. 5).

It is odd that such a shrewd man as Moses had some doubt concerning the zoological affinities of the coney, for he classes it with mammals as dissimilar as a camel

This animal has many names. In the Old Testament it is the Coney. In Africa men know it as the Rock-Rabbit or the Dassie. Zoologists cannot agree on a suitable name; some prefer Hyrax and others Procavia.

and a hare, but it does not "chew the cud." The fondness of these curious animals for rocks is well set out in Psalm civ. 18. The high hills are a refuge for the wild goats; and the rocks for the conies (also Proverbs, xxx. 26).

The hyrax eats the bark of trees, young shoots, and grass. Some conies live in trees, and it has been suggested that they should be ranked in a special genus, *Dendohyrax*. These arboreal forms are able to run up the tall juniper and other trees, and disappear in the holes in their trunks, or hide in the clefts of big branches. They are very active and make a great noise at night: and for this reason have been called "gnomes of the primeval forest."

On one occasion we pitched our camp at Molo (8,000 feet above sea level) near a piece of thick forest; a few hours after sunset the tree conies made a tremendous noise, hissing and squealing for two hours or more. It surprised me, because I was ignorant that they made any noise and it equally astonished me to learn that they are nocturnal animals, and can readily climb trees!

In describing the zoological results of the Ruwenzori Expedition, 1905–6, Wroughton states that the hyrax was found in swarms at an altitute of 10,000 feet on Ruwenzori. The animals frequented the cliffs and caves of the tree-heath zone. "They made weird and extraordinary noises in a weird and extraordinary place." These noises are undoubtedly responsible for the Ruwenzori "ghost-story."

The natives catch large numbers of them in snares, and the skins are sent in great numbers to Europe, especially since they have come into fashion for making waistcoats and lining motor-coats.

The water of Lake Nakuru is brackish: this makes it attractive to many birds, especially ducks and flamingoes, and many mammals, for they will travel many miles to a salt-lick.

Amongst the immense numbers of birds which visit this lake I was able to recognise flamingoes, ducks, geese, swallows, bee-eaters, colies, shrikes, guinea fowl, avocets, stilts, herons, wagtails, saddle-billed storks, ibises, screaming plovers, vultures, hawks, eagles, bustards, secretary birds, and quails. An attractive

bird found here in abundance is the vivacious brown chat with white wings, termed by witty widows the flirting chat, because it spends so much time in courting the hens. These birds seem to be dancing, singing, or fluttering in the air as long as the sun shines.

The Honey-guide (*Indicator major*).
Natives find this bird useful, as it leads them to the bees' nests, but sportsmen regard it as a nuisance, for it alarms the game by its twittering.

The honey-guides have nothing to recommend themselves to the notice of man in the way of size or plumage. They are about the size of larks, with dun-coloured plumage and bills like sparrows. Some of these birds have the habit of leading men to the nests of bees. This habit was first described by Sparrman

(1777), and his observations have been confirmed by many experienced African travellers, including Livingstone. The natives accept it as a guide; when they observe this bird fluttering from tree to tree, uttering shrill cries, they follow it, and are invariably led to a nest. In return for such services the guide is rewarded with a share of the spoils in the form of a piece of comb containing grubs. Some ornithologists ridicule the idea

The Ethiopian Bush Shrike.
Sometimes called the Organ Shrike.

of the bird acting in this way, and others believe it strongly. Millais in *A Breath from the Veldt*, 1895, gives a detailed account of the honey-guide, and states that his boy found four nests of honey in a very short time by following the bird.

The sportsman finds the honey-guide a nuisance, for it occasionally happens that he is making a careful silent stalk towards the game when this bird flies up and alarms all animals within hearing by its chattering,

The honey-guide was originally described as a cuckoo (*Cuculus indicator*), sometimes the Bee cuckoo. It resembles the cuckoos in two particulars. Its feet are zygodactylous, that is, the four toes are arranged in two pairs, of which one pair is turned forward and the

A Bush Shrike (*Dryoscopus funebris*).
Speke's "Black metal-toned Whistler."

other backwards. The other feature is not to the credit of either bird, for it is asserted that the honey-guide, like the cuckoo, lays its eggs in the nest of some other bird and allows the rightful owner of the nest to hatch out both sets of eggs.

Shrikes are numerous throughout the Ethiopian Region, and there are many species, due probably to the abundance of dense thorny thickets in which these birds live and which afford admirable protection to their nests. A shrike perched on the topmost twig, or at the end of a long projecting bough, of a leafless thorn tree, keeping a keen look-out, is a characteristic feature of the Nyika. Two particularly interested me. On the morning after our arrival at Lake Nakuru I was astonished to hear a call exactly like that of the Bell-bird (*Cotinga*), loud and clear like the sound of a hammer striking a ringing blow on an anvil. It was a long time before I could get these birds identified. One is a bush shrike, which Speke called the "Black metal-toned Whistler," and the other is the Æthiopian Bush Shrike (*Laniarius æthiopicus*), sometimes called the Organ Shrike. They inhabit the undergrowth, and though plentiful are shy and rarely seen. It is stated that organ shrikes pair for life. Many bush shrikes make weird noises, and as they have the habit of sneaking away in the bush, it is often hard to recognise the author of a particular noise or call.

When these shrikes produce the bell sound, they reply to each other from distant points with such exactitude and in such quick succession that the calls seem to be uttered by one bird. (Böhm.) This has a peculiar ventriloquistic effect when the listener is unaware that the sounds are produced by two birds. The bell-like note uttered by these shrikes has left a deep and ineffaceable impression on my memory.

XVI

THE LION—MONARCH OF THE GRASS PLAIN

From the very beginning of recorded history mankind has taken a keen interest in the lion. The Hebrew portions of the Bible abound in referenees which make the roaring of the lion share with thunder the distinetion of being the embodiment of terror. Among our earliest stories relating to the lion is that whieh tells how David in his shepherd days killed a lion and a bear whieh had taken a lamb from his flock ; a mighty deed for a youth, and an earnest of his ambition to slay Goliath. Poets from the earliest times have immortalised the lion ; Homer in the vivid description of the eombat between Aehilles and Æneas likens the onset of Pelides to a lion rushing on his prey.

With tottering strides Æneas first advanced ;
The nodding plumage on his helmet danced ;
Spread o'er his breast the fencing shield he bore,
And, as he moved, his javelin flamed before.
Not so Pelides ; furious to engage,
He rush'd impetuous. Such the lion's rage,
Who, viewing first his foes with scornful eyes,
Though all in arms the peopled city rise,
Stalks careless on, with unregarding pride :
Till at the length, by some brave youth defied,
To his bold spear the savage turns alone ;
He murmurs fury with a hollow groan ;
He grins, he foams, he rolls his eyes around ;
Lash'd by his tail his heaving sides resound ;
He calls up all his rage, he grinds his teeth
Resolved on vengeance, or resolved on death.

—*Iliad*, Book XX.

The name of lion is so linked with our language that we speak of lion-hearted kings, squires, and warriors. The animal is emblazoned on shields and banners ; it is the emblem of one evangelist and many saints. It appears in the arms of the King of England and is the symbol for British pluck.

To-day in British East Africa, the naked Masai armed only with spears and shields kill this ferocious brute, and with pardonable pride a brave warrior wears the mane as an adornment for his head on festive occasions and in war.

Formerly lions flourished throughout Africa, south-eastern Europe, Asia Minor, Persia, and India. Civilisation has driven them from Europe, and in Asia they are found in restricted districts. Lions must have been easily accessible to the Romans, if the statements made by historians are true concerning the great numbers of these animals exhibited and destroyed in the amphitheatres Some of them were obtained in Mauretania, a country comprising the north-west corner of Africa, now represented by Algeria and a part of Morocco.

Those who desire to see the lion in a natural state generally attempt to visit him in East Africa or in Somaliland. No one can live in or visit these countries without having his attention very forcibly directed to these brutes.

It is a great shock to learn that the lion, which from our childhood ranks in our minds as the King of Beasts, is in a British colony classed as vermin, and no licence is required to kill him.

The lion has no great use for human beings as food. It is true when old age affects the lion's joints and his teeth are worn he takes to man-eating : killing such strong mammals as the zebra, buffalo, ox, and donkey, his favourite food, requires agility as well as strength, whereas it is a simple process to haunt the neighbourhood of villages and secure defenceless men and women.

A lion of this kind may, and occasionally does, terrorise a large district.

On the journey to Mombasa we had an excellent opportunity of examining a lion at Aden. The proprietor of the largest hotel on this sun-burnt rock had a young Somali lion which he kept as a pet

The end of a lion's tail showing the terminal prickle.
(Museum, Royal College of Surgeons, England.)

chained up like a dog on the verandah. The handsome beast lived on mutton and milk; in spite of such good living it was docile and allowed the man who fed him to do whatever he pleased even to the extent of straightening out his tail in order that I might examine the prickle which is usually found at its tip. Whenever I see a lion alive or dead a strong yearning comes

over me to examine the prickle hidden in the tuft of long hair at the tip of the tail.

Much of the doubt about this prickle at the end of the lion's tail is due to the fact that poetical imagination has pictured the lion goading himself to fury by lashing himself with the tail; this is a fable; the lion could not even scratch himself with this caudal spike.

The lion at Aden illustrated very forcibly that, like other cats, he was nocturnal in habits; during daylight he remained quiet and often slept soundly, but at eventide he woke up, and as the darkness deepened he placed his paws on the top rail of the verandah and roared at the "niggers" in the street below.

The lion in British East Africa must be considered from the point of view of the sportsman and of the settler. This great cat abounds in the Protectorate especially in its high plateaus, and it has been killed at an altitude of 6,200 feet by Major Powell-Cotton; but it thrives best at a moderate elevation. Lions are always numerous where zebra and antelope abound; to these and similar animals they are a nightly terror. Lions often move about in company: Mr. F. J. Jackson saw a troop of twenty-three near Machakos, and Mr. Newman once saw fifteen together north-east of Kenia. Soon after the construction of the Uganda Railway the lions were a great nuisance as well as a real menace to those who worked on the line, and a reward of 200 rupees was offered to those who killed a lion. It happend that the driver of a traction engine saw a troop of seven lions, and he managed in one morning to shoot the lot and thus secured 1,400 rupees.

The fascination of lion shooting is easy to understand. There are five formidable game animals in Africa:—the lion, elephant, buffalo, rhinoceros and leopard; it is only necessary to visit the country to find evidence among the sportsmen of personal damage, and many bold and experienced hunters have lost their lives in encounters with these dangerous beasts. It is

true there are conditions in which the lion appears to behave like a coward, and may be shot almost as easily and with as little danger as a buck, but when angry and wounded he is a formidable beast to encounter. Many agree with Kirby's opinion of the lion : "He is neither cur nor fiend and is only magnanimous when his stomach is full." The colour of the lion makes concealment an easy matter in the long dry grass : his agility, strength, and ferocity render it dangerous to meddle with him even when the hunter is a man of experience, coolness, skill, and courage armed with a perfect rifle.

An angry or wounded lion when "charging" requires some courage on the part of the assailant, for in this condition he rushes through the long grass with the tail stiff and erect, lips retracted, exposing the teeth and jaws, and uttering a hoarse, grunting roar. He may be described as ferocity personified, for "he is resolved on vengeance, or resolved on death," and not unfrequently the lion is the winner. It is true that a charging lion will sometimes turn aside when hit, but it is equally true that after receiving a mortal wound his vitality is such that he has retained sufficient strength to kill, or badly maul, the hunter before dying.

On one occasion a hunter detected a lioness in some long dry grass. He carefully approached, and fired at her head. She fell apparently dead. Before venturing near the lioness he looked carefully around to satisfy himself that none other was about, when his boy noticed a lioness stealthily coming towards them. When the animal was within fifteen yards he fired and killed it. His surprise may be imagined on finding that it was the lioness he had previously shot : she had recovered from the shock and was coming for him. The two bullets had entered the skull accurately between the eyes about an inch from each other.

A hungry lion on a dark night is a daring and dangerous beast, and there are so many authentic

stories which illustrate this side of the brute's character that it will be unnecessary to add to them.

During my visit I was desirous to obtain first-hand information concerning the ability of lions to inflict crushing blows with their paws. For instance, Patterson relates, in his absorbing account of the events around a water-hole which he witnessed one night from a thorn-shelter or boma, that a lion struck down a zebra by a blow on the neck. The observer in this instance was many yards from the scene of this midnight encounter, and, although it was bright moonlight, we must remember that the whole event is so quick that it is difficult to be precise as to details.

Two men riding in a cart drawn by two humped oxen were suddenly surprised by a lion springing upon the oxen and killing them: the lion then badly scratched the driver and made off. The driver's companion became insane. It was gravely asserted that the lion killed the oxen with his paw. No further proof was obtainable; the evidence is inconclusive. I can readily believe that, when a lion springs on the neck of a horse and fastens on with his teeth, the long canine teeth do occasionally penetrate the interspaces of the vertebræ and injure the spinal cord in a very vital region and prove instantly fatal. Roosevelt mentions a case bearing on this, in connection with an adventure which befell Captain Slatter:—

"The lion had sprung clean on the horse's back, his fore-claws dug clean into the horse's shoulders, his hind-claws cutting into its haunches, while the great fangs bit at the neck. After going some sixty yards the lion's teeth went through the spinal cord, and the ride was over."

Homer knew it was the habit of lions to seize large animals by the neck:

> As when the lordly lion seeks his food
> Where grazing heifers range the lonely wood,
> He leaps amidst them with a furious bound,
> Bends their strong necks and tears them to the ground.

The most instructive piece of information I have been able to obtain concerning the power of the lion's paw to inflict a blow was furnished to me by Mr. Glazebrook.

Lions are sometimes shot at night by what may be called the boma method. It is carried out in the following manner :—

A boma capable of containing three men, the hunter and two boys, is made of thorn trees. A donkey is hobbled close to the boma ; the hobbling consists in binding the hind-legs together by means of a rope ; the fore-legs are also tied together and the loose ends of rope are buried in a hole in the ground and made secure, so that the donkey cannot move and no rope is visible. A hole made in the thorn fence enables the hunter inside to command with his rifle the area occupied by the donkey. The men watch in turn ; if anything is heard it is communicated to the hunter by pinching his foot, snoring and whispering are inadmissible.

This manœuvre is best carried out on a dark night. The lion and all marauding mammals hate the moon. The earth's satellite must upset the calculations of hungry carnivora ; they have no nautical almanac to inform them of its rising and setting.

On this occasion the hunter, after peering through the hole in the boma for two hours, fell asleep : the gun-bearer awakened him by pinching his foot, and he became aware of something moving on the ground rapidly, and this movement was followed by a tremendous crash. He could dimly discern a huge form standing over another form lying on the ground. He fired his heavy rifle at the dark object : this was followed by a heavy fall. On peering through the hole he could make out the donkey standing up.

At dawn, the lion was lying close up to the wall of the boma, dead. The bullet had entered its head. The donkey appeared to be uninjured, except for a few claw marks about its ears ; it was released from its

hobble. Later in the day the donkey did not appear to be well and was re-examined : the top of the animal's head appeared as if it consisted of skin only ; no bone could be felt. The lion had smitten the head of the donkey so forcibly, and broken it in, that it appeared to be devoid of bone : later in the day the donkey was shot.

Lions are shy of a tethered animal if they see the rope. Drake-Brockman, in his account of the Mammals of Somaliland (1910), refers to a wary lion which he tried to entice within the range of his rifle on three successive nights. At last, in order to enable the lion to gorge himself, so that he could be more easily followed, a donkey was tied to a tree. In the middle of the night the hunter was disturbed by much noise and dust ; amidst the dust the donkey was "standing under the wall of the zareba with a small uprooted tree by his side."

In the morning the footprints of the lion were found round the place where the donkey had been tied to the tree, which it pulled up in its fright and dragged to camp. The sand-marks indicated that the lion had not merely walked round and round the donkey, but had crouched within a few yards of him and whisked the sand with his tail.

Schillings, who had excellent opportunities of observing the manner in which a lion kills, states that it creeps up towards its prey and springs upon and kills it with a bite on the back of the neck.

It is quite certain that when lions attack human beings they do not kill them "on the spot," as the phrase goes, unless they seize them by the head ; then death is instantaneous. All who have read Patterson's thrilling account of the Man-Eaters of Tsavo, will remember that some of the victims, even after they had been dragged through the thorn bushes forming the boma, could be heard shouting whilst in the grip of the lion.

A valuable instance is furnished by Dr. Ansorge. In one of his journeys a lion had seized a sleeping porter by the thigh and was making off with him. The watch raised an alarm; the camp awoke and the men seized burning brands and rushed into the bush. The lion dropped the porter and made off. The injured man told a remarkable story:—

"Though the lion had seized him and was carrying him off, he was still asleep: our shouts woke him up and to his horror he found that he himself was being carried off by the lion, and then he clasped his arms around the lion's neck and screamed."

In this instance the porter owed his escape to the fact that the lion ran against a strong projecting branch of a tree, which severely scraped the skin and hair from the animal's body.

An incident which happened in the Rovuma valley described by Weule supports this contention:—

"A native woman was sitting near the door of a hut with her husband and child when an impudent lion sprang on her in broad daylight and dragged her away. The poor woman could be heard shrieking 'Nna kufa! Nna kufa!' (I die, I die) as the brute dragged her through the wood and the voice grew fainter and fainter, but none could help."

There is a story current in British East Africa to the effect that a lion seized a white hunter by the shoulder, but whilst being dragged away, the hunter had the presence of mind to draw the knife from his belt, fatally stab the lion, and save his own life. Mr. F. C. Selous informed me that this desperate adventure is well authenticated.

The settler dislikes the lion, and with good reason, for it preys on the cattle and sheep, and destroys the ostriches. Moreover, they cause the zebra to stampede, and break the barbed wire around the farm.

When zebras abound in a district, in order to prevent them eating the young crops, the farmer surrounds

his property with barbed wire; this costs with the posts about £40 per mile. Zebras run together often in large herds, and if it happens that a lion, lioness, and family are on the prowl, the herd becomes alarmed when these huge cats are in the vicinity and often stampedes. If in the course of their mad rush they come against any barbed wire, it will be broken down for many yards. One settler explained to me that lions find the wire useful, for when the panic-stricken zebras rush the wire, one or more of the animals may be entangled in the loose ends and fall an easy prey.

The settlers find strychnia an extremely useful poison for destroying lions. I find that they adopt the following method :—

A zebra is shot and the carcase is partly flayed, and the exposed fleshy part of the carcase has a few grains of strychnia spread upon it. The results are excellent. In one year a settler destroyed at least seventeen lions: the carcases of nine were found near the bait and the skeletons of the remainder in adjacent parts of the farm after the grass had been fired. In addition, he poisoned numerous leopards and hyænas.

It is a fact worth remembering, in poisoning meat with strychnia, not to put much of the drug on the carcase. If the lion gets too much strychnia he will vomit and thus, getting rid of the drug, escape death.

From the earliest times lions have been a terror to herdsmen. A representation of two lions killing an ox was emblazoned on the noble shield made by Vulcan, at the request of Thetis, for Achilles:

> Two lions rushing from the wood appear'd,
> And seized a bull, the master of the herd.

The presence of lions in the neighbourhood of civilised communities is a source of much unpleasant excitement and occasionally terror. Some years ago, a man-eating lion became notorious for taking patients

out of a temporary hospital built near a construction camp, close to the railway. In order to protect the hospital a strong boma was built around it, and two Englishmen decided to watch for the lion from the interior of a railway transport van. To enable them to watch the hospital they had the upper half of the door of the wagon open ; the lower half was closed for their own protection. In due course they saw the lion spring over the boma into the hospital compound ; but all the doors and windows had been secured. The two men watched closely with the hope of seeing the lion return from the boma and had their faces level with the top of the half door of the van, when they were suddenly startled by feeling the lion's breath in their faces : the brute had attempted to seize them over the top of the half door. He failed because he was unable to obtain a secure grip on the narrow metal edge of the doors. In the morning the marks of the lion's claws were obvious on the painted door.

In contrast with a grim tale of this kind there are many like the following :—

Lady Delamère was returning to her home after a dance : the native boy preceded her with a lamp. Suddenly a dark form rose between her and the lamp-boy with a savage growl and quickly disappeared. It was a lion.

It is well known to surgeons who have had the care of patients badly mauled with lions or leopards that the wounds do not heal kindly. This is easily understood, for such wounds are made by septic teeth and claws that have been tearing animal tissues. Not only are the wounds slow in healing on account of the profuse suppuration, the sequel of the septic poisoning, but even when healed Dr. F. L. Henderson, who has had charge of several hunters who had been mauled, tells me that the scars are often persistently painful.

That scratches inflicted by feline animals are septic admits of ready demonstration. Terriers are very fond

of worrying a cat and puss can only defend herself with claws. If the cat succeeds in scratching the cornea of the dog which is annoying her, she has an ample revenge, for the wound is sure to suppurate, ulcerate, and if the eye be not destroyed by the septic infection, a milk-white tell-tale scar will be left on the eye, as a souvenir of the dog's unworthy encounter with a cat. This simple sequel of a cat scratch indicates in a small way what happens when man is bitten or scratched with the dirty teeth and claws of a lion.

XVII

THE CROCODILE—LORD OF THE RIVER

The crocodile is a denizen of all African rivers and many lakes. These dangerous reptiles make their home in the water, but bask on the sand-banks during the day. Crocodiles are very voracious; nothing comes amiss to them, whether rats, water-fowl, sheep, goats, antelopes, children, women, or men. They are wonderfully adapted for the conditions under which they live.

The skin of the crocodile is hard, and beset with scales: the portion covering the back contains a series of ossified plates, or scutes, which form a reliable dermal armour.

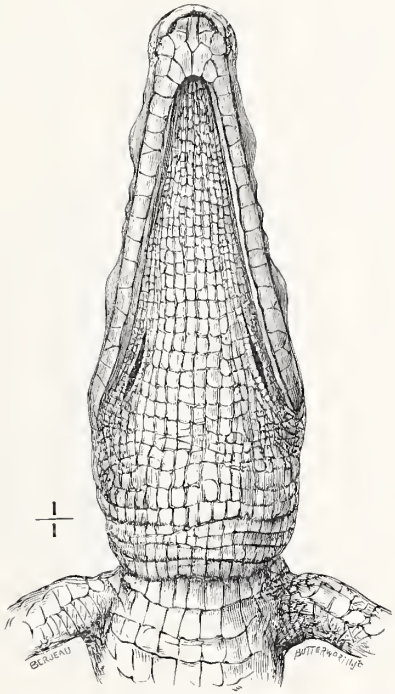
Crocodiles emit a peculiar musky odour: this is due to a pale brown, greasy material secreted by two sets of glands. One pair is situated in the skin of the throat; the others are concealed in the walls of the cloaca. The throat glands are lodged in two pockets, and the entrances to them are in the form of slits in the skin, lying parallel with the lower jaws. I removed these glands from a recently killed crocodile ten feet long. The cloacal glands were as big as walnuts. Their minute structure was like that of the sebaceous, or grease, glands in the skin of man. The throat glands were globular and half an inch in diameter. They differed in structure from the cloacal pair and were more complex. Gadow states that when young crocodiles are excited the throat pouches can be everted like the fingers of gloves. In all probability these scent

glands belong to the same class of organs as the face glands of antelopes and deer. The musk bags of crocodiles are much prized by natives : some of them eat the flesh of these reptiles, but it is distasteful to Europeans. Those who have partaken of crocodile flesh complain of

The Crocodile.
This brute is lord of African lakes and rivers.

its musky taste. The odour of crocodiles is especially obnoxious to me : during the years I made *post mortem* examinations of animals dying in the Gardens of the Zoological Society, London, the scent exhaled from crocodiles during dissection made me ill for several hours. It still exercises this unpleasant effect on me.

The respiratory mechanism of the crocodile is arranged in a cunning way to suit the requirements of a rapacious reptile which obtains its prey in the water, for terrestrial animals secured by these brutes are dragged under water and drowned. Crocodiles breathe by means of lungs which, as usual, communicate with the nasal passages by means of a windpipe (trachea) of the usual construction. Their nostrils are on the upper surface of the broad snout and appear as a pair of slits: each nostril is guarded by an oval sphincter which enables them to open and close the nostrils at will exactly as other animals can open and close their eyelids. I have not been able to satisfy myself that a crocodile can close one nostril independently of the other, as is the case with the eyelids in the act known as winking with one eye.

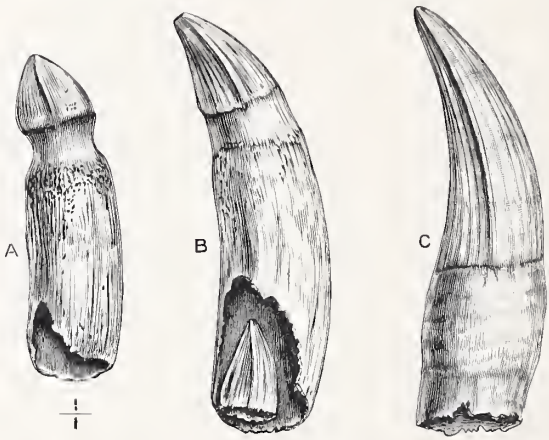


Under surface of the head of a young crocodile showing the openings of the musk gland.

The tongue of the crocodile is thick, flat, and so fixed to the floor of the mouth that it cannot be protruded. The hinder margin of the tongue is raised into a transverse fold which meets the soft palate and shuts off the cavity of the mouth from the pharynx. This arrangement enables the crocodile to lie completely submerged in water with only the nostrils exposed and respire freely without any risk of water

entering the windpipe, although the mouth may be filled with it.

When swimming, the body of the crocodile is submerged ; the parts which remain above the water are the snout and upper parts of the head, with the eyes and ear-lids. The powerful tail is a very efficient swimming organ. If alarmed when swimming the crocodile sinks and may remain submerged a long time. The keeper of the reptile house at the London "Zoo" assures me that these reptiles will lie completely submerged in the tank



Teeth of a Crocodile.

A. An old worn-out tooth about to be shed.
B. A tooth in use with its successor lying in the pulp chamber.
C. A tooth in its prime.

for half an hour. Visitors often call his attention to a crocodile lying immovable at the bottom of the tank believing it to be dead, and will not be satisfied until he has roused it with a rod. One crocodile has lived in the Zoological Gardens thirty-four years.

The crocodile is well furnished with teeth : they are implanted in deep sockets along the margins of the upper and lower jaws. The teeth vary in shape and in number in different species of crocodiles, but they are

fairly constant in a given species. Sixty-eight or seventy teeth is not an uncommon number for a crocodile of the Nile. In some species of these reptiles the teeth interlock as thoroughly as the teeth of a rat-trap; in others the interlocking is not so complete, but they are very efficient, for the strength of the teeth and jaws of crocodiles is such that they rarely let go any animal that is fairly seized.

The teeth are conical—somewhat compressed from side to side—which gives them sharp edges: they vary much in size, and the fourth in the lower (mandibular) set is so constantly larger than the teeth immediately adjacent that it is sometimes termed the canine tooth. This long tooth fits into a notch in the side of the upper jaw. The teeth consist of dentine, capped by enamel, and the roots have a coating of cementum.

Crocodiles shed their teeth throughout life, but they are quickly replaced. The method of replacement is after this fashion:—The young tooth grows on the median side of the functional tooth; as the new tooth increases in size the adjacent wall of the root of its predecessor is absorbed. Eventually the new tooth is found within the pulp cavity of the one it is destined to replace. In due course the persistent growth of the young tooth pushes the old one out, and takes its place: when this happens a new tooth has started to supplant it in turn.

A newly-cut tooth has a sharp point: by use the point is worn down, but the edges are retained; coincident with the wear of the crown, erosion takes place at the margin of the enamel-cap and a definite groove forms around the tooth, dividing it into a crown, neck, and root. This is only seen in old teeth. Sometimes the crown of an old tooth has facets due to wear.

The digestive organs of crocodiles are very powerful. Birds, small mammals and portions of large animals are retained in a wide and capacious gullet until the stomach is ready to receive them.

The stomach is a globular organ not unlike a bird's gizzard ; this is due to the fact that it has a tendinous centre in each wall, and its cavity often contains stones, The digestive power of the gastric secretions is very great ; animal flesh and bones are quickly dissolved.

How indifferently crocodiles take toll of animals at and in the rivers or pools is testified by the following objects found in the stomach of a crocodile twelve feet long, killed by K. Roosevelt in the Guaso Nyero, British East Africa : it "had in its belly sticks, stones, the claws of a cheetah, the hoofs of an impalla, and the big bones of an eland, together with the shell plates of one

Side View of the Skull of a Crocodile.
The brute had been a terror to the inhabitants of the Nile, near Silsilis. When shot, its stomach contained three hoofs of a sheep, a donkey's hoof, a donkey's bridle, and a boy's ear-ring. (Museum, Royal College of Surgeons.)

of the large river turtles." The usual food of the crocodile is fish, and the bodies of drowned animals.

There are good reasons for the belief that some crocodiles, like aged lions, tigers, or leopards, turn man-eaters. An old crocodile shot in the Nile near Silsilis in 1877, had been a terror to the inhabitants of a long stretch of the valley. The following objects were found in its stomach :—

Three hoofs of a sheep, a donkey's hoof, a donkey's bridle, and a boy's ear-ring. This crocodile measured 15 ft. 9 in. and was reputed to be eighty years of age. Its skeleton is preserved in the museum of the Royal College of Surgeons, England.

As in the case of whales, the size of crocodiles has been greatly exaggerated. In the rivers and lakes of East Africa, and in the Nile itself, a crocodile measuring fifteen feet, from the snout to the tip of the tail, is considered a big specimen.

The senses of sight and hearing in these wary reptiles are remarkably acute. No one knows the age to which they live. Crocodiles lay eggs, sometimes to the number of three score. The eggs are white, oval, and possess hard shells ; they are laid and well concealed in sand, out of reach of moisture, for this causes them to decay quickly.

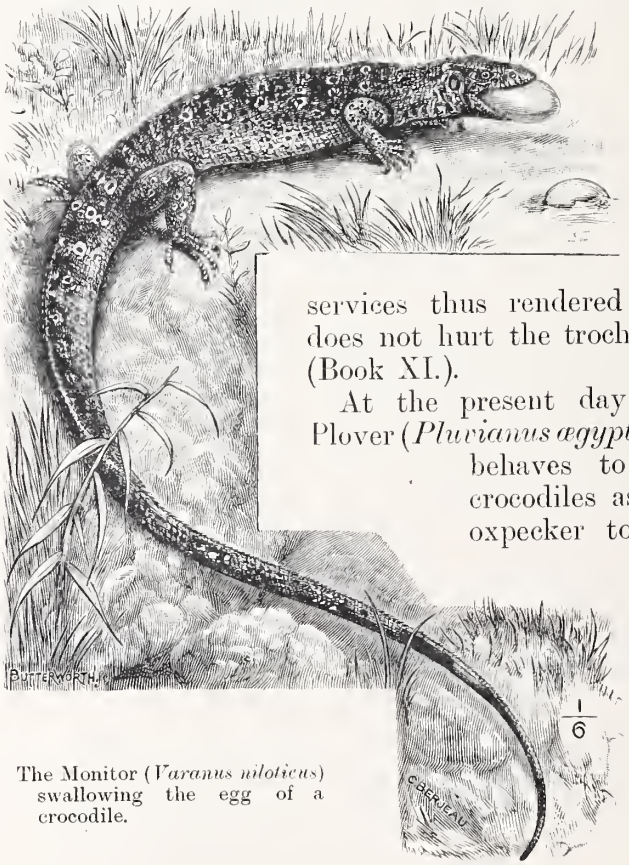
The Varanus lizard or monitor is fond of crocodile eggs and is an adept at finding them in the sand. This lizard attains a length of five feet and is common in the upper reaches of the Nile : it lives in the trees and in water, and generally plunges into the stream when disturbed. Varanus lives largely on fish and no doubt captures and eats small mammals and birds : it uses the long heavy tail as a whip, especially when driven into a corner. Most visitors to the Zoological Gardens, London, have seen the monitor critically examine an egg with its forked tongue, then take the egg into its mouth, crush it, and after swallowing the contents eject the shell. Monitors are very critical as to the quality of an egg.

It was thought probable that the crocodiles in the Victoria Nyanza were carriers of trypanosomes. This suspicion proved to be groundless. The red capsules of the crocodile are elliptical, like those of birds, and are easily identified with the aid of a microscope : during the investigation of sleeping sickness this fact enabled the observers to determine from an examination of tsetse flies whether they had been feeding on crocodiles or not.

The story, related by Herodotus, concerning the crocodile and the bird *Trochilus* has always excited curiosity in the minds of ornithologists interested in the

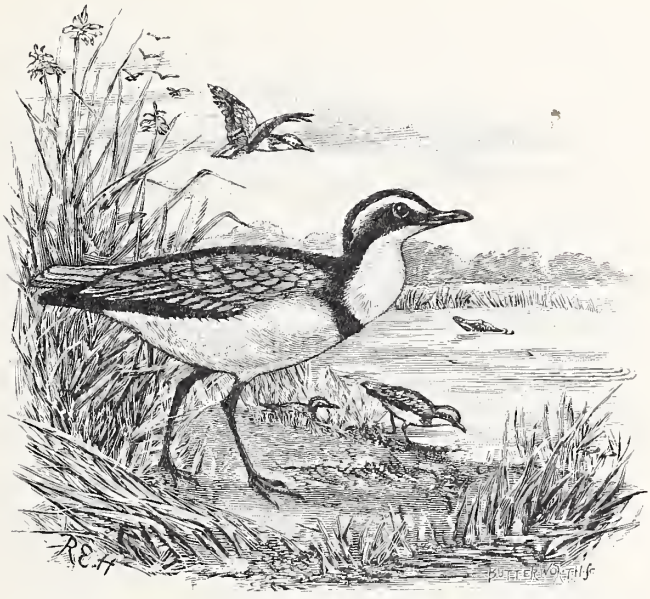
birds of Egypt. This ancient historian affirmed that the crocodile, though living in the water, "has its mouth entirely filled with leeches. So that while all other birds and beasts avoid the crocodile the trochilus lives peacefully with it, and at times enters his mouth and gulps down the leeches. The crocodile is pleased at the services thus rendered and does not hurt the trochilus" (Book XI.).

At the present day the Plover (*Pluvianus ægypticus*) behaves to the crocodiles as the oxpecker to the rhinoceros, hippopotamus and buffalo, for it hops about their bodies and rids them of the vermin which lie in the creases of their thick skins. This plover has been called the crocodile's living tooth-pick. I have endeavoured to



The Monitor (*Varanus niloticus*) swallowing the egg of a crocodile.

see the bird engaged in such an interesting occupation but without success, and I have never met with a hunter or traveller who has seen it at this work. Even Livingstone during the whole time he was in Africa "never witnessed this friendly act." The boatmen on the White Nile point out a plover which they call *Ghaffir* (watchman) for the following reason: When a



The Plover (*Pluvianus ægypticus*) is as useful to crocodiles as the oxpecker to cattle and kudus. This plover was known to Herodotus, who refers to it as the *Trochilus*.

boat approaches crocodiles lying on the banks or sand-spits, the bird flies up twittering and warns the sleeping reptiles. The buff-backed heron (*Bubulcus lucidus*), sometimes called the cow-heron, picks leeches, &c., from crocodiles as well as ticks from cattle and elephants.

These dutiful birds are useful; for whilst hunting

vermin in the folds and creases of the skin of elephants and crocodiles, their cries and flutterings warn the sleeping animals of the approach of danger.

In former times crocodiles flourished in that section of the Nile which flows through Lower Egypt. The crocodile was worshipped in Egypt from very early

The Buff-backed Heron which picks leeches from crocodiles and ticks from elephants and cattle.

times as the representative of the Nile-god Sebek. The chief shrines were at Crocodilopolis in Upper Egypt: the people who dwelt near Thebes and the lake of Moeris regarded them as especially sacred. The people in each of these districts brought up one crocodile in particular. When this had been tamed, they placed, according to Herodotus, bracelets round its fore-feet. When these

sacred reptiles died they were mummified. In other parts of Egypt crocodiles were hunted and killed as noxious beasts.

The traffic on the Lower Nile, the persecutions to which they are subject from modern firearms, as well as the turmoil caused by paddle-boats and stern-wheelers,

Danger lurks at the drinking pool for goats as well as for men and women. The strength of the teeth and jaws of crocodiles is such that they rarely let go any animal that is fairly seized.

have driven the crocodile almost completely out of the Nile below Khartum.

The "gigantic rain-puddle," as Moore calls the Victoria Nyanza, swarms with crocodiles, and they lie sunning themselves on the rocks or concealed in the water waiting for antelopes, men, women, and children.

Some of the religions of the Sesse islanders were horrible. One of the gods (Kitinda) accepted no offering but men. The crocodile was his priest. When it was considered necessary to appease Kitinda a man was hauled to the brink of the lake, where his knees and elbows were broken so that he could not crawl away. He was then abandoned and the crocodiles came and seized him. (Cunningham.) Sometimes many men were treated in this way to appease the god.

In Murchison Bay there is a small conical islet (Kabulataka) thickly covered with trees. When the Mahomedan party was defeated, Mutesa ordered the prisoners to be placed on this island and left there to die of starvation or to be eaten by the crocodiles which haunted its margins. A military guard on the mainland prevented the prisoners from swimming ashore. None escaped.

The danger which human beings run from crocodiles appears to vary in different localities. In the Nile, these reptiles are dangerous to men, and particularly to women who fetch water from the river. In many parts of the river this risk is so appreciable that it is the custom to fence off the watering places with stakes, to prevent the women being seized by crocodiles when dipping water. The fear of crocodiles is hereditary among natives throughout the whole of Africa.

The frequent reports of trustworthy observers indicate that large crocodiles lie in ambush in shadowy parts of the river, or swim on the water like a log of wood, and suddenly knock an unwary man or woman into the water by a swish of their powerful tails. When fishing in crocodile-haunted water it is dangerous to stand too near the river's brink.

Authentic reports are available of boys being dragged into the water by crocodiles when leaning over the side of a canoe. A. H. Neumann, when sitting in his tent by the shore of Lake Rudolf, was suddenly alarmed by a scream: on rushing out he was horrified to see his

gun-bearer in the jaws of a large crocodile. The man had been seized whilst bathing.

A man in the jaws of a crocodile has fewer chances of escape than one in the power of a lion, for the scene of the tragedy is in the water, and its action is very swift.

The leading features of such dreadful events are :— A loud and piteous scream of terror, a violent agitation of the water near the spot where the victim was standing, which only lasts for a few minutes, and the tragedy is complete.

XVIII

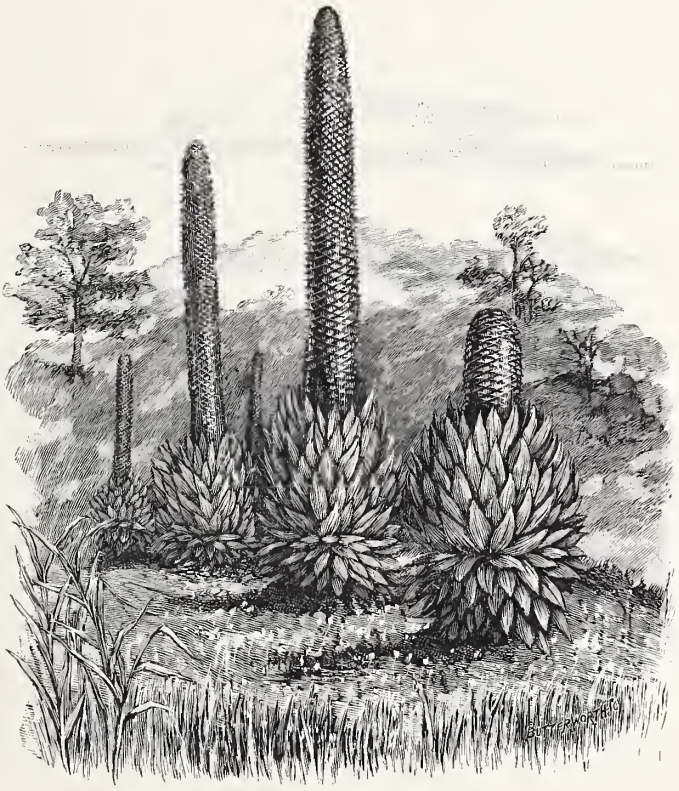
THE CRATERS OF THE RIFT VALLEY

Soon after leaving the Island of Mombasa by the Uganda Railway, the traveller will realise that he is in a volcanic district. The brick-red earth and the character of the rocks exposed in the railway cuttings indicate that the soil is the result of the disintegration of lava. All doubts on this matter will be removed when passing through the forest regions north of Nairobi, the train suddenly comes to the edge of the Kikuyu escarpment, and he looks directly into the Rift Valley, one of the most remarkable physical features of Eastern Ethiopia.

In order to appreciate the character of the Rift Valley it is necessary to realise that the British East Africa and Uganda Protectorates represent an area of something more than 500,000 square miles. The coastlands of this enormous territory are low : on leaving the coast the land rises in a series of plateaus until a broad zone of high ground is reached, varying in height from 6,000 to 8,000 feet. This zone is often spoken of as the Highlands of East Africa. This high plateau, which presents remarkable evidence of stupendous volcanic action, is furrowed by a gigantic trench known as the Rift Valley. Projecting around the margins of this high tableland there are three enormous mountains crowned with perpetual snow : Kilimanjaro (19,321 ft.) in German Territory ; Ruwenzori (16,619 ft.) on the Congo side ; and Kenia (17,000 ft.) in the east. There are isolated smaller mountains such as Elgon, Longonot,

and Suswa; and the Aberdare mountains with the high peak of Kinangop (13,214 ft.).

The Rift Valley differs from the common kind of valley in the character of its lateral boundaries. In valleys, as a rule, the sides slope gradually from the



Giant Lobelias (*L. Deckenii*).

high ground to the low, but in this valley the sides are, in places, as steep and abrupt as those of a grave: indeed the traveller may suddenly come to the edge of one of these steep walls and run a risk of tumbling over. Steep boundaries of this kind are called "escarpments";

thus, along the eastern side of the Rift Valley in its deepest and most pronounced section we have the Kikuyu escarpment and the Laikipia escarpment. On the western side there is the Mau escarpment, the Kamasia escarpment, and so on. The characters of the fauna and the flora on the plateau east and west of the valley are alike. The floor is a tract of the table-land which has sunk many feet below the level of the surrounding plain, but the subsidence has not affected the area equally. The central portions have sunk most: even in this feature of the valley abruptness is its chief characteristic, for in crossing it, the traveller will find himself traversing a series of terraces, sometimes a mile or more wide, which suddenly terminate with a boundary as vertical as the wall of a fortress. The faces of these scarps afford some indications of the immense force which led to the formation of this remarkable trough-like valley; for they show that the rock has been torn through, and the fractured surface presents that same rough appearance as a sugar-loaf rent in twain. The abruptness of the changes are very remarkable. Gregory, in describing his journey to Baringo, relates that he was walking ahead of his caravan when suddenly, without the slightest warning, he found himself on the edge of a precipice 1,900 feet in height. For some hundreds of feet the cliff was absolutely vertical. The change was so startling that for a moment it made him feel giddy.

We had a similar experience during a visit to Menengai. After examining the crater we made our way along its rim to the southern corner and suddenly found ourselves on the verge of a vertical wall of rock, absolutely bare of vegetation, black, rough, and stern. We were unable to determine its altitude because our aneroid had been stolen.

The Rift Valley was probably caused by subsidence after extensive and stupendous volcanic action. The only thing I can compare it with is the Grand

Canyon of Arizona, a mighty gorge usually attributed to erosion.

Several writers hold the opinion that the Rift Valley represents a portion only of an extensive depression which contains the Jordan Valley, the Dead Sea, the Red Sea, and the Gulf of Aden. In Africa this depression continues a south-westerly course until it reaches Lake Rudolf. It then divides; the western arm of the valley curves around the Victoria Nyanza and ends in the district of Lake Nyasa. The two arms of this huge trench are separated by 6° of longitude. The other shorter, or eastern arm, runs directly south, following the 36th meridian of longitude, terminating in German Territory. It is this eastern arm with which we are concerned. The Victoria Nyanza lies in the area included between its eastern and western arms.

There is geological evidence to show that great earth movements have happened along this Rift Valley at a recent date, which makes it probable that native traditions of great changes in the structure of the country are recollections of geographical events. Gregory also points out that, if all the air and water were removed from the earth, this huge rift would present much the same aspect to an inhabitant of the moon as some of the larger lunar rills present to us.

As bearing on the question of the geological relationship of the Palestine to the African section of this valley Gunther's opinion may be mentioned; that the fishes found in the system of the Jordan present so many African types that they must be included in a description of the Ethiopian region. This points to an original connection between the rivers of Palestine and Central Africa. The infusion of African forms in the Jordan cannot be accounted for by any of the accidental means of dispersal. The depression which contains the River Jordan, the Sea of Galilee, and the Dead Sea, known as the Jordan-Arabah Valley, displays abundant evidence of volcanic action.

The southern extremity of the western arm was investigated by Burton and Speke, who discovered Lake Tanganyika (1858), and Lake Nyasa by Livingstone (1859). The western lake-chain has been carefully investigated by Moore and especially Lake Tanganyika (1896 and 1899).

Lobelia Wollastoni.
Lobelia ground on Mount Ruwenzori. (From a photograph by Dr. A. F. R. Wollaston, *Journal of the Linnean Society*, 1908, xxxviii, Pl. xvii, Fig. 7.)

Lake Tanganyika is the longest lake in the world ; it measures 420 miles in length, its breadth varies from 30 to 50 miles. In some parts it is very deep. This enormous rocky cistern is formed by the subsidence of a long narrow tract of country, and the surrounding

plateaus fall abruptly to the lake: some of the cliffs are several thousand feet high. The lake is 2,700 feet above sea-level and forms an abrupt termination to the southern end of the western arm of the Rift Valley.

Gregory has drawn attention to a point of some interest in regard to Tanganyika: the natives of Ujiji have a folk-lore that goes back to the time when the lake was formed by the flooding of a fertile valley.

In regard to the Red Sea some curious folk-lore is available, for the Somalis believe that when their ancestors crossed from Arabia, to Africa, there was a land connection across the Straits of Bab-el-mandeb.

Fischer demonstrated the existence of the Rift Valley in Equatorial Africa (1883). Joseph Thomson explored the parts of the valley around Lake Baringo (1883), and Count Teleki, accompanied by Lieutenant von Höhnel, travelling along the eastern extension of the Rift in 1887–8, discovered Lakes Rudolf and Stefanie (the latter has since dried up), as well as an active volcano at the south end of Lake Rudolf. Gregory investigated the portion of the valley which traverses the British East Africa Protectorate in 1892–3, especially from the geological point of view, and ascended Mount Kenia. He admirably sums up the matter:—From the Lebanons almost to the Cape there runs a valley, unique, on account of the persistence with which it maintains its trough-like form throughout the whole of its course of 4,000 miles, and on account of the fact that scattered along its floor is a series of over thirty lakes, of which only one has an outlet to the sea.

The section of the Rift valley bordered by the Kikuyu and the Mau escarpments has a width of about twenty miles. The floor of the valley in the neighbourhood of Lake Naivasha is 6,300 feet above sea-level. The edge of the Kikuyu escarpment is 1,400 feet above the floor of the valley and that of Mau is 8,300 feet above sea-

level. The Kikuyu escarpment is abrupt and the forest runs right up to its edge. The floor of the valley resembles a narrow plain containing broken hills, sheer walls of pumice, extinct and active volcanoes and steam-vents, in addition to the chain of lakes.

Among the extinct volcanoes on the floor of this valley mention must be made of Longonot, Suswa, and Menengai. Longonot stands at a very imposing cone on the floor of the valley. Thomson climbed this mountain in 1883 and found on reaching the top that he was on the "sharp rim of an enormous pit." It was not an inverted cone, as volcanic craters frequently are, but a great circular cavity, with perfectly perpendicular walls, without a break in any part, though on the south-western side rose a peak several hundred feet above the general level of the rim." The margin of the crater is so sharp that Thomson writes that he "sat astride on it with one leg dangling over the abyss internally, and the other down the side of the mountain. The bottom of the pit seemed quite level; it was covered with acacia trees. There were no bushes or creepers growing from the walls.

Gregory investigated this mountain in 1892: its lower part consists of a series of platforms or terraces of lava. The rock is a black trachytic pumice and contains a good deal of obsidian (volcanic glass). The cone is in the main composed of lava. He discovered a large steam-vent on the inner face of the north wall of the crater and climbed the peak on the western side mentioned by Thomson and found it 1,800 feet higher than the rim of the crater. He mentions that at the point where he reached the rim of the crater it had been worn by zebras into a cinder track, and that a descent could easily be made into the crater on the southern side. The height of Longonot is 9,350 feet.

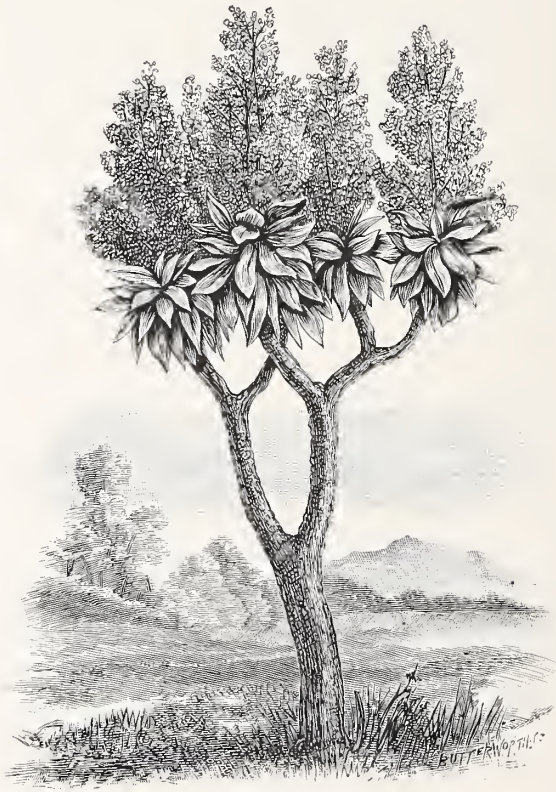
Hobley has climbed the mountain; he informed me that the crater is 1,300 feet deep. Near Longonot there exists a deep vertical split in the rocks and the

exposed surface of the rock in this cleft presents an arrangement of basaltic columns resembling that of Fingal's cave. The recess is a favourite resort and breeding place of vultures.

Concerning Suswa I can give no information. I had no opportunity of climbing it and have not met anyone who had; but whilst at Nakuru I took the opportunity of visiting the extinct crater of Menengai. The ascent would be a pleasant ride were it not for the tall coarse grass which covers its sides and makes the journey troublesome for men and mules. The exterior of this cone, like Longonot, presents a series of platform-like terraces with fairly steep slopes between the platforms. The edge of the crater on the side near Nakuru is well-marked; the inner side is a steep, grass-covered slope several hundred feet long, which ends abruptly at an almost perpendicular wall extending to the floor of the crater more than 200 feet below. The southern and western portions of the crater-rim are complete, but the northern and eastern portions are wanting: the floor of the crater, occupied by a thick forest, slopes away to the floor of the valley. There is sufficient of the crater wall left to furnish a loud echo. It is reported that a steam-vent exists in the crater and that it is visited and venerated by the Masai, but we failed to find it.

The grass on the outer slopes near the summit, as well as on the inner face of the crater, was traversed by game tracks. The crater itself is visited by elephants, zebras, antelopes, and lions. A herd of eland occasionally graze in it, and we obtained an example of Chanler's reedbuck in the crater itself: after the animal was shot the "boys" showed great trepidation about descending into the crater for fear of lions. This, however, did not prevent us enjoying the extraordinary spectacle presented by the valley when seen from a height, especially the peculiar purple light which tinges the edges of the escarpments when the sun shines on them. A similar purple tint hangs about the mountains surrounding the

Dead Sea. On the grassy floor of the valley we could distinguish, with the aid of the field glass, a herd of zebra, Thomson's gazelles, and several ostriches. With great reluctance we turned our backs on this fantastic vision



Giant Groundsel, *Senecio Johnstoni*, from Kenia. It attains a height of sixteen feet; the stem usually branches twice or thrice, and is surmounted by a flower-spike three feet high. The flowers are orange-coloured.

and descended the slopes on that side of Menengai nearest Lake Nakuru. On the way down the mountain we saw Lake Elmenteita glistening in the sun like a sheet of burnished silver. The hunter hurried us along

because lions were known to lurk about the long grass, and he thought it advisable to reach Nakuru before the sun went down.

It interested me very much to find craters existing in the Rift Valley with their sides clothed with tall grass, the floor of the crater occupied with a forest, and the whole basin large enough to afford food and shelter for herds of wild animals, some of them—rhinoceros and elephant—being the biggest mammals living on this planet to-day.

The most common fate of the crater of an extinct volcano in Europe is to become a receptacle for water. Two of the best examples are Lakes Albano and Nemi near Rome. It is, however, historical that toward the end of the seventeenth century the crater walls of Vesuvius were hung with trees and brushwood; its floor was a grassy plain on which cattle grazed and the wild boar lurked in the thickets.

Mount Elgon is an extinct volcano with a base forty miles in diameter. The greatest altitude at the rim is 14,200 feet. The crater, eight miles in diameter, is crossed by a native track from north to south. Snow falls on the highest points of this mountain, but does not lie long. Joseph Thomson discovered this mountain in 1883 and described it as an outpost of the great central lava-field of Masailand. This explorer also reached the remarkable caves on the southern slope which have puzzled everyone who has visited them since his day. The upper slopes of Elgon are clothed with dense forests formed in part of bamboos: the lower slopes are very fertile and bananas grow abundantly.

There are no active volcanic signs at the southern extremity of the Rift Valley; near the equatorial section of this meridional trench there are a few indications in the shape of steam-vents and hot springs. There is a steam-vent on Longonot, and some very active jets on Donyo Buru, and one is reported on Menengai. There are hot springs at the southern end of Baringo, also sulphur

springs and a steam-vent on one of the islands in this lake (see p. 247).

Donyo Buru (Steam Mountain), situated under the Mau escarpment near Lake Naivasha, reaches a height of nearly 9,000 feet. Thomson visited this mountain and observed that two of the cones were composed largely of obsidian. The steam holes lie in a pit on the side of the mountain (7,055 feet). Clouds of vapour are ejected with a puffing sound. In places where the emission of steam is very copious it hissed as if it came from the safety-valve of an engine. The surrounding rock was so hot that the men could not walk on it, and was disintegrating, under the influence of the steam, into a crimson-red clay. This clay was considered to have a wonderful medicinal virtue, and the men painted themselves with it.

The chief seat of volcanic activity in relation to the Rift Valley exists at the northern section, especially around the southern end of Lake Rudolf. There is in this region an active volcano, Mount Teleki. When Donaldson Smith visited this region, a few years later than Teleki, a great stream of glowing lava issued from one of the craters.

Near the shore of Lake Rudolf there is an extinct volcano, Mount Kuloll, nearly 6,000 feet high. The crater has fallen in and broken up. The mountain is split from top to bottom : " The fissure is about twenty yards wide, and from the bottom it is scarcely possible to distinguish trees at the top, so high are the vertical walls." (Donaldson Smith.) The upper slopes of the mountain are well wooded, whilst the base is proportionately barren.

Around the lake there are masses of magnetic iron, which so affected the compasses that the route could not be accurately mapped. When a compass was held " near the ground the needle turned right round." (L. von Höhnel.)

Kenia (or Kenya) is a stupendous mass (17,184 ft.)

situated south of the Equator (37·20 E. long.). It is a denuded volcano with several peaks, extensive valleys, many lakes, thick forests, and numerous glaciers.

It seems extraordinary to us, who visit British East Africa to-day, that this magnificent mountain was unknown to Europeans sixty years ago. The missionary Krapf saw Kegnia, or Kenia, December 3rd, 1849, but his reports were not sufficiently convincing to European geographers. Joseph Thomson wrote a brief but admirable description of Kenia, and recognised its volcanic nature in 1883. He also pointed out that almost the only times at which it is to be seen are the early morning and evening. Everyone who has seen this mountain in the afternoon free from cloud must feel with Thomson that it is "entrancing, awe-inspiring." Kenia has since been visited and explored by a number of able scientific men, including Count Teleki (1889), Gregory (1893), and Mackinder (1899).

The discovery of each of these glacier-capped mountains in the equatorial zone of East Africa has an air of romance: Kilimanjaro was unknown to Europeans until the missionary Rebmann saw its silver-crowned summit, May 11th, 1848. The natives told Rebmann that the silver-like stuff, when brought down in bottles, turned to water. The news of the discovery of a snow-covered mountain under the equator was received with incredulity by geographers until Thomson's observations were published (1883).

Krapf saw Kenia, as already mentioned, in 1849, and the mighty mass of Ruwenzori filled Stanley with astonishment when he saw its snow-clad peaks suddenly issue from their cloudy obscurity (1888). He saw them three days in succession. It is important to realise that the traveller may be in the vicinity of these lofty mountains for many days without being aware of their existence. So far as Ruwenzori is concerned, we must remember that Stanley had a thousand men within easy visual distance of this mountain for seventy-two days, and no one

suspected its existence until one day the clouds parted and unveiled its magnificient white peaks.

Dr. Filhppi, who wrote the account of the Duke of the Abruzzi's expedition to Ruwenzori (1896), explains the

Lobelia gibberoa.

A lobelia ground on Ruwenzori, 7,000 feet. (From a photograph by Dr. A. F. R. Wollaston, *Journal of the Linnean Society*, 1908, xxxviii, Pl. xvii, Fig. 3.

persistent rainy season on this mountain range by the fact that it rises like an island from the vast marshy plains of Uganda and the boundless forest of the Congo; it is a centre of attraction for the mass of vapour sucked up by the tropical sun, condensing round the

frozen peaks and forming a permanent veil of fog and cloud.

Woosnam, in his account of the Ruwenzori Expedition, 1905–6, states that one of the most characteristic and, at the same time, most objectionable features of Ruwenzori is the ever-present cloud which forms every morning and veils the upper regions in gloom and moisture. It disappears almost as regularly every evening at sunset, the mountains being nearly always clear of cloud in the night. This is why these mountains remained undiscovered so long. The cloud forms at an altitude of 9,000 feet and drifts upwards, and about 10 a.m. the mountain is obscured.

Similar cloud conditions prevail on Kenia and Kilimanjaro. The summits of these mountains are visible at daybreak and at 4 p.m. They are very beautiful as they peer above the clouds. No wonder the Masai regard the glacier-covered summit of Kilimanjaro as the "home of a god."

There are some curious floral conditions on Kenia, Kilimanjaro, and Ruwenzori, associated with this persistent humidity. The lower slopes of Kenia are clothed with dense forests of junipers and podocarps, in which herds of elephants roam. Half-way up the mountain (8,000 to 10,000 feet) there are forests of huge bamboos in which the stems are so tightly packed together that only an elephant can force a way. Those who climb Kenia must traverse the bamboo zone and the way is cleared by cutting the bamboos with bills. When bamboos attain a height of fifteen feet they begin to branch and the long, thin leaves interlace, forming a dense canopy. Along the edge of the forest the narrow grass-like leaves of the bamboo look very pretty as they wave in the breeze. Above the bamboo forests the flora is very remarkable and consists of giant groundsel occurring in groves. At a distance these groves look "like a table covered with flowers" (von Höhnel). There are lobelia grounds carpeted with thick moss, and

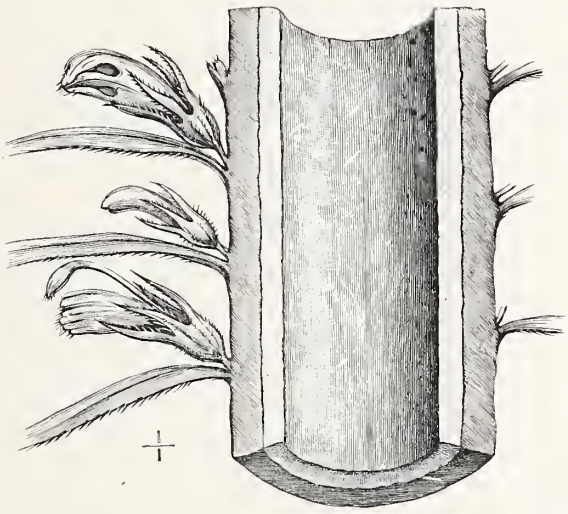
the tree-lobelias when in flower are visited by flocks of beautiful sunbirds (see p. 376). A species of St. John's wort assumes here a tree-like form and the everlasting flower *Helichrysum* flourishes up to the level of the snow. This pretty flower takes the place of Edelweiss in Alpine regions. At an altitude of 11,000 to 12,000 feet the ground and tree trunks are covered with an extraordinary growth of moss (*Usnea*). In these humid places the heaths grow into big trees, some of them fifty feet high.

The arborescent groundsels have been recently studied by Woosnam on Ruwenzori. At first a senecio is a small plant not unlike a cabbage: gradually the stem lengthens and gives out branches with a tuft of bright green leaves at the end: as the plant grows the old leaves shrivel and droop, hanging down the stem one upon another till the upper parts of the branches near the green tuft are transformed into great swollen masses of dead leaves tightly packed together. These senecio trees attain a great age, which it would not be too much to estimate at anything from fifty to one hundred years, or even more.

The lobelias are more remarkable than the groundsels. They are found on Ruwenzori, Kilimanjaro, and Kenia. On all these mountains from 7,000 to 15,000 feet these tree-lobelias flourish and many attain a height of fifteen feet or more.

A tree-lobelia consists of a basal portion crowded with aloe-like leaves. From the stem, a flower column or spike arises. This in some species (*L. Deckenii*) is hollow and lined with pith. The flowers grow out at right angles to the column and are borne in the axils of the bracts. These bracts are long and often give the flower-column a ragged appearance. The sepals are light green and the flowers dark violet; when the flowers are mature they produce an exquisite shimmering of colour. Woosnam is of opinion that the lobelias live to a great age, but it is a long time before they come into blossom,

perhaps fifteen or twenty years. Once a lobelia has reached the stage of producing a flower-spike and bursting into blossom, it has reached the end of its life. It may take twelve months for the spike to finish blossoming; then the whole plant withers and dries up, and probably stands for several years before it falls and is swallowed up by the moss. In *L. Stuhlmanni* the leaves as they die fall off, leaving the stem bare except for green leaves.



The flower-column of a Tree-lobelia, *L. Telekei*, Kenia; real size. The blossoms are shown open and closed. The sepals are bright green; the petals, violet.

In *L. Deckenii* none of the leaves fall off and the stem is entirely concealed by them, from the ground up to the spike, which has a much greater circumference than in other lobelia. This species without its flower-stalk often appears as a rosette of leaves squat on the ground.

In *L. Wollastoni* some leaves fall off and others remain hanging, so it usually has a portion of the stem exposed. These differences in the relation of the dead

leaves to the stem of the lobelias produces such an alteration in their appearance that a casual observer would not regard *L. Stuhlmanni* and *L. Deckenii* as closely related plants.

On Ruwenzori, Kilimanjaro, and Kenia the giant lobelias may be seen in hundreds in the moss-covered swampy ground and resemble "monuments in a cemetery" (Johnston).

It is reasonable to hope that in due time a good transport road will be made from Nairobi to Mount Kenia, and motor trips to Kenia, including excursions to the bamboo forest, the groundsel and lobelia grounds, and the glaciers, will be an additional attraction to those who visit the new colony.

References.

Johnston, Sir H. *The Uganda Protectorate.* Vol. I. London, 1904.

Krapf, J. L. ... *Travels in Eastern Africa.* London, 1860.

Livingstone, D. ... *Expedition to the Zambesi.*

Stanley, Sir H. M. *Through the Dark Continent.* 1878. Vol. I.

Speke, J. H. ... *What Led to the Discovery of the Source of the Nile.* London, 1864.

Thomson, J. ... *Through Masailand.* London, 1885.

Rendle, A. B. ... *An Account of the Plants Collected on Mt. Ruwenzori by Dr. A. F. R. Wollaston.*

Baker, E. G., and Moore, S. le M. *Journal of the Linnean Society,* 1908.

XIX

THE RIFT VALLEY AND ITS LAKES

In the preceding chapter it was stated that the Rift Valley consists of a western and an eastern arm ; along the floor of each there is a chain of lakes. When these lakes are compared with each other an examination of their contours shows that there are two kinds : some, like the Albert Nyanza and Tanganyika, are long and trough-like ; others are rounded, like Lake Naivasha. The long and narrow lakes resemble fiords with high precipitous sides. Such are often called cistern-lakes. The best examples of this kind lie in the western arm of the Rift Valley, and include Lakes Albert, Albert Edward, Kivu, Tanganyika, and Nyasa.

The Lake Chain in the eastern arm of the Rift Valley concerns us most. In this set we have Lakes Naivasha, Elementeita, Nakuru, Baringo, Rudolf (Basso Narok), and many smaller collections of water in the valley which have received distinctive names. At the southern end of its eastern arm the floor of the Rift Valley has an altitude of 2,500 feet. It rises gradually as it extends northward to the equator ; at Naivasha the floor of the valley is 6,300 feet above sea-level : it then falls to 3,325 at Lake Baringo, and Lake Rudolf is only 1,250 feet above the level of the sea.

Lake Naivasha.—This lake, situated at an altitude of 6,300 feet, was discovered by Fischer (1883). The lake is somewhat quadrilateral, twelve miles long and nine broad : it is comparatively shallow. The water is supplied by the Rivers Gilgil and Murundat.

The lake has probably been formed by the piling up of volcanic debris across the valley and damming back these two streams. The freshness of the water in spite of the absence of an outlet may indicate that the lake is of recent origin.

Along the southern shore of the lake there are many pinnacles and fragments of rock, but on its western borders, especially along the slopes of the Mau escarpment, there is more vegetation. The grass along its southern shore affords food for the Masai cattle, sheep, and goats, as well as for kongoni, zebra, and gazelles.

There are two islands in the lake, but as the Masai know nothing about canoes, they remained long unvisited. The first explorers found the game unusually tame. There are hippopotamuses, but no crocodiles. Papyrus rush grows freely around the lake shores, which are visited by many varieties of birds, some of which are very beautiful.

Lake Elementeita.—This lake lies between the Naivasha and Nakuru lakes at an altitude of 5,860 feet, and is very beautiful. The water is salt, though it receives two rivers, the Kariandusi and the Guaso Nagut. The level of this lake is being lowered by evaporation, and, like Lake Nakuru, it is slowly shrinking. When marching towards these lakes the traveller becomes aware of a peculiar physical condition of the valley. When the sheet of water is first seen it appears to be near at hand; suddenly the traveller finds himself on the edge of a precipice with an abrupt face, standing above a lower-lying plain, or plateau, which may be one or two miles wide, separating him from the lake, and at the end of this lower-lying plateau he may find himself standing on the edge of a wall of rock, high above the water of the lake. This formation is common throughout the Rift Valley. The south-eastern end of Lake Elementeita is studded with trees and abounds in animals and birds.

Lake Nakuru. This picturesque lake lies in a basin 5845 miles above sea level, 57 miles from Lake Naivasha. It is surrounded in parts by high rocky precipices and receives the water of the Enderit, Little Enderit, and a third stream enters it on the north. The water is salt; the amount of solids it contains must be great for the shore is covered with a thick deposit of soda. Lake Nakuru has been a much more extensive sheet of water than it is to-day. During the time my camp was near it I made a careful examination of the wide area of sloping ground to the north of the lake and found it composed of alluvial débris, the favourite resort of many burrowing animals.

On the northern shore there is a thick reed-belt, a thicket of acacia-trees, and excellent grass. The neighbourhood of the lake abounds in abrupt precipices surmounted with candelabra euphorbias, aloes, and acacias. The thickets and reed-beds afford cover for many animals, and its brackish waters are the resort of huge flocks of birds.

Lake Baringo. This body of fresh water has an altitude of 3325 feet: it is 18 miles long and 10 broad situated in a flat district. It receives the rivers Tigrish and the lower Molo (Nyuki). Much uncertainty existed concerning the position, the condition, and even the actual existence of Baringo as a separate lake until Thomson visited it in 1883. He described it as an isolated basin of no great size, but exquisitely charming with its pretty isles.

The lake contains fishes, crocodiles, and hippopotamuses. The neighbourhood of the lake abounds in zebras, antelopes, jackals, baboons, and hyænas.

Thomson observes that one of the most remarkable facts about Baringo is the large amount of water it receives even in the dry season without rising in level to any extent, or finding an outlet. In the wet season the level of the lake rises very little, probably not more than two feet, yet the water remains sweet.

A large island in the lake is inhabited. The people who live on it cultivate the soil, and use canoes of peculiar construction but "as light as corks," Major Powell-Cotton has carefully described these canoes: they are built of the stems of the ambatch, a plant which grows near the margin of the lake and attains a height of fifteen feet: it has a fairly straight stem, the bark is furnished with thorns, and its orange flowers are like those of the bean. When dry, the stem being filled with pith, it is extremely light. The ambatch grows rapidly and as its roots merely dip into the water and mud, large clusters of this plant are easily detached by wind or by current and form floating islands.

The canoes on Lake Baringo are about 90 inches long and thirty wide: the sides are seventeen inches deep, and the bows higher and wider than the stern. The ambatch stems are bound together with the inner bark of the thorn tree, and the seams are caulked with drift vegetable matter found near the margin of the lake. They are propelled at the rate of three miles an hour by means of two wooden paddles, and are built to hold two men. These ambatch canoes remind one of the coracle of the ancient Britons. (The coracle is used to-day by the fishermen on the river Wye.) Rafts made of ambatch stems are used by the Shilluks on the upper reaches of the White Nile; the ambatch plant flourishes in, and is an important constituent of the sudd.

Thomson expressed the opinion that the formation of lake Baringo was due to a secondary subsidence in the Rift Valley, and that the island was the upper part of the cone of a volcano which had disappeared by sinking below the level of the surrounding country, forming in consequence a receptacle for the water of the lake, This view has been confirmed. Major Powell-Cotton (1902) found the island had all the appearance of a sunken crater. It had an average diameter of a mile. At a place called Labourri, quite close to the edge of the lake, there is a little bright green plot, some eighty yards

square studded with pools smelling of sulphur and yellow patches of discoloured grass. There are nearly fifty pools, extending to and under the surface of the lake. The largest pool had a diameter of ten feet, and the water is clear and more than twenty feet deep and the bubbles could be seen rising from the bottom. Some of the smaller pools throw out an intermittent jet of steam and others are continuously on the boil. On a hill-side behind the springs there is a steam vent, which hisses and booms incessantly. When visiting them it is the usual custom to catch some of the fishes which abound in the lake and cook them in one of the hot springs. This form of amusement is well-known to tourists who visit the famous lake in the Yellowstone Park.

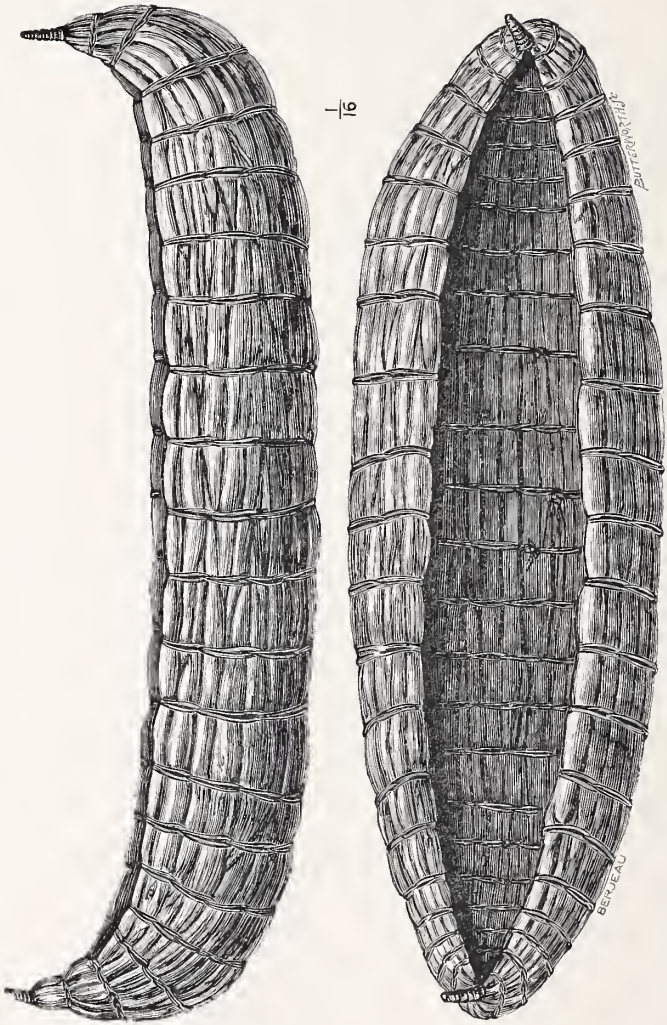
Most travellers who have visited Lake Baringo express the opinion that great changes have taken place in its physical conformation. The northern end of the lake contains partly submerged trees. Powell-Cotton states that some of the older natives remember when it was possible to walk from the southern end of the lake to the islands, where now there is comparatively deep water.

The country around this lake may be described as the hunter's paradise. It abounds in large animals, including elephants, and swarms with flies and gnats.

When Major Powell-Cotton visited the island in the lake (in 1902) the natives were worried by baboons, which came around the huts and helped themselves to food in spite of all remonstrance. The islanders begged him to shoot some of the hooligans, but they were cunning and kept out of the way.

Lake Hannington. This lake is situated at a point where the Rift Valley begins its northern descent. The lake, which contains salt water, is concealed in a rift under the Laikipia escarpment, so that it was overlooked by the early explorers. The north end of the lake is separated from Lake Baringo by a marshy district, and, as Sir Harry Johnston points out, it is conceivable that

in seasons of exceptional rain the waters of the two lakes may mingle.



The canoe of ambatch stalks used by the natives of the island in Lake Baringo. (British Museum.)

This lake is visited in enormous numbers by flamingoes which collect mainly on the northern part of the lake and on the submerged banks; the lake shores are

white with guano deposited by them. Near this side of the lake there is a large mud plain where the flamingoes make their nests unmolested by man. The mounds of mud which represent their nests appear like innumerable mole-hills.

When these huge flocks of birds are disturbed and they get up suddenly out of the shallow guano-laden water, the stench is overpowering.

Lake Rudolf. This lake, which lies at the northern end of the Rift Valley, is kidney-shaped and measures along the curved axis 185 miles: its greatest width is about 35 miles. The altitude of the lake is 1250 feet. Although the water is brackish it is drinkable; as its salinity is due to soda it can be made palatable and effervescent by the addition of tartaric acid. Ludwig von Höhnel, the scribe of Count Teleki's interesting expedition which led to the discovery and investigation of this lake, describes the great enthusiasm with which the thirsty porters rushed to the lake after a terribly trying journey and their bitter disappointment at finding the water brackish and the districts surrounding the southern end of the lake uninhabited. Subsequently the water was found to be drinkable though brackish, and it had a peculiar lye-like taste. They then concluded that it contained soda, and on pouring tartaric acid into the water it effervesced strongly. This improved the taste considerably, and it quenched their thirst more quickly than fresh water could have done.

The southern portion of the lake is surrounded by high cliffs, and a rugged lava-strewn, bare, and uninhabited country. There is also an active volcano, Mount Teleki. Like other large lakes it is liable to storms, and on such occasions the waves striking on the beach roar like the sea.

Near the south end of the lake there is an island, ten miles long, consisting of sixteen extinct volcanoes. There are other islets nearing the middle of the lake some of which are inhabited. Lake Rudolf

receives at its northern end the waters of the river Omo which rises in the Shoa highlands.

The lake contains hippopotamuses, fishes, and crocodiles: its shores are "haunted by immense numbers of birds, including geese, ducks, flamingoes, cormorants, divers, herons, ibises, plovers, gulls, and storks." The birds are most abundant at the northern end where the shore is sandy and there are pools cut off from the main body of the lake.

Lake Stefanie. This lake was discovered by Teleki (1889) and named in honour of the Archduchess Stefanie, widow of Crown Prince Rudolf. It lies to the east of the northern end of Lake Rudolf, in that portion of the Rift Valley where this remarkable depression loses its well-defined character. At the time of its discovery the lake was about sixty miles long and fifteen broad, lying at an altitude of 1740 feet; the water is brackish. At the time of its discovery there were indications of shrinking. On the beach and in the air there were thousands of scavenger birds, such as vultures, crows, cormorants, marabou storks and the like, glutting themselves with fish, which lay about in great quantities in various stages of decomposition. Donaldson Smith, a few years later, found the lake to be thirty-seven geographical miles long and fifteen broad. In no part was the lake more than twenty feet deep. There were eight islands which formed sanctuaries for millions of aquatic birds. In 1899 Harrison found the lake dried up.

This chain of lakes in the Rift Valley is of great interest, especially in relation to the formation of those bodies of water of which the Dead Sea and Salt Lake in Utah are the best known examples.

Usually a fresh-water lake has an outlet: failing this its water becomes brackish, for, although many of these brackish lakes receive very large quantities of fresh water from the rivers flowing into them, the condensation due to evaporation, especially under a tropical sun, soon

increases the specific gravity of the water. Thus, the water of the Dead Sea which lies 1300 feet below the level of the Mediterranean Sea, contains 25 per cent. of solids. The water of Salt Lake, Utah, has about the same proportion of solids. Lake Nakuru is in a similar condition. Lake Rudolf is probably undergoing a like change, due to the prolonged drought which has affected the northern section of the Rift Valley.

Soda Lakes. There is a deposit of natural soda covering an area of thirty square miles, known as Lake Magadi, at the southern end of the eastern arm of the Rift Valley. The deposit is estimated to contain 200,000,000 tons of soda; whenever a portion of the surface soda is removed, it is quickly replaced, as though it were pushed up from below. Further south in German territory there exists another soda lake, known as Lake Natron, discovered by Fischer (1883).

References.

Moore, J. E. S. ... *The Tanganyika Problem.* London, 1903.

Gregory, J. W. ... *The Great Rift Valley.* London, 1896.

Huxley, T. H. ... *Hasisadra's Adventure.* Essays on Controverted Questions. London, 1892.

Höhnel, L. von ... *Discovery of Lakes Rudolf and Stefanie.* Translated by Nancy Bell. 1894.

Powell-Cotton, P. H. G. *In Unknown Africa.* London, 1904.

Smith, A. Donaldson ... *Through Unknown African Countries.* London, 1897.

Neumann, A. H. ... *Elephant Hunting in East Equatorial Africa.*

XX

THORNS—"THE RELENTLESS TYRANTS OF THE WILDERNESS"

All writers on the flora of Eastern Ethiopia draw attention to the priekliness of the trees, shrubs, and plants. Thorns occur on the stems, branches, stalks, and leaves of many trees. Botanists ascribe to thorns useful purposes. Prickles on seeds, especially if barbed, aid in dispersal, by causing them to fasten on the bodies of passing animals. Spines serve to protect plants from being eaten by birds, animals, and insects such as slugs.

The bow-string hemp, *Sansevieria cylindrica*, has its sword-like leaves tipped with a spine so sharp that it readily penetrates leather. The butcher-bird, *Lanius humeralis*, uses the Mauritian hemp (Agave) as a larder, and impales its victims on the sharp tips of the leaves. Many succulent plants are armed with thorns, or have leaves pointed like bayonets, or edged like saws.

The great feature of the flora of the Nyika (desert) is the specialisation of trees and plants to resist desiccation and death during periods of drought. This is effected by reducing the surfaces which allow loss of moisture by transpiration. In many parts of East Africa there are only two rainy seasons, and each is of short duration. When water is scarce animals eat succulent leaves in spite of the thorns. Elephants and lesser kudus chew the thick leaves of the Sansevieria in order to obtain the juice which they contain, and drop the "chewed" fibre. These bundles of chewed fibre, bleached by the sun, are found in districts over-run by elephants, and bundles

of maccrated hemp are sometimes found in their stomachs.

Another useful, though spiny, member of the Agave family imported into East Africa is the Sisal plant, *Agave rigida*, a native of Mexico: it is cultivated for

The Bow-string Hemp.
The tips of the leaves are so sharp that they penetrate leather.

fibre. These plants have long broad leaves, furnished in some species with a strong terminal spine: in others, the edges of the leaves are furnished with teeth.

The Agaves are interesting because they can be propagated by suckers from the base of the stem, by bulbils

or seed. Bulbils are modified buds, and appear as small tuberous bodies on the flowering branches, lodged in the

Sisal plant. Cultivated for fibre in East Africa.
The edges of some species are furnished with spines.

axils below the flowers. They contain a reserve store of nutritive substances and remain on the flower stalk

until they are four or six inches long, then fall to the ground, take root, and produce a new plant. Bulbils are often present on sisal plants in great numbers.

Men universally curse thorns, and it is useful to remember that the production of thorns is one of the consequences of Adam's unfortunate error in eating Eve's apple (Gen. iii. 18). Animals have just as much reason to dislike thorns. On many African trees and bushes thorns are not only sharp and long, but brittle, and break off when they penetrate the flesh. Roosevelt, describing his hunting experiences along the Guaso Nyero, refers to mimosas with long straight thorns which are so plentiful "that almost all the lions have festering sores in their paws because of the spines which have broken off in them." Reference has already been made to the frequent suffering and pain thorns cause the natives and porters who traverse the Nyika and forests (p. 168). Some are so sharp and long that the natives use them as "hair-lip pins" for bringing the edges of flesh wounds together (p. 114).

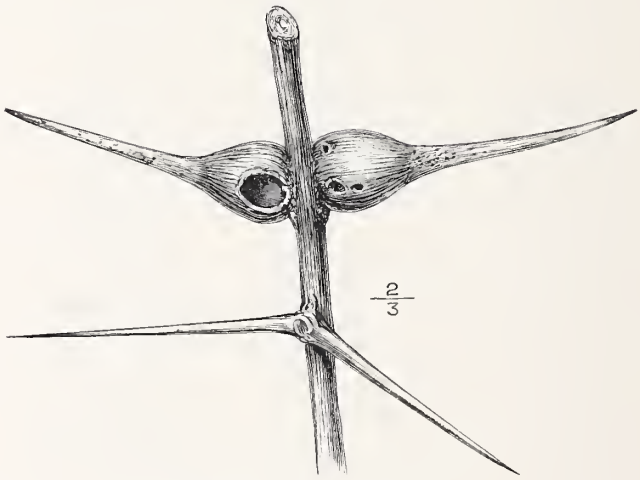
Around Nairobi, and especially in the gardens of Entebbe, a handsome solanum tree flourishes and bears flowers like those of the potato. It has large green laurel-like leaves, and on the stalk of each leaf there is a formidable curved thorn an inch long.

A curious tree, termed *Acacia fistulosa* by Schweinfurth, has an Arabian name, "soffar," which signifies a flute or pipe. It appears that the larvæ of insects work their way into the bases of the young thorns, which then swell into globular bladders an inch in diameter. The mature insect escapes from this chamber by a circular opening. This hole in the hollow bulb at the base of the thorn causes it to emit a flute-like sound when the wind plays upon it.

Schillings, in describing the "Lonely wonder-world of the Nyika," refers to the strange melody produced by the wind playing through a grove of acacias beset with these curious Æolian harps. He also mentions that

these little musical boxes are often the dwelling-places of ants. If these strange habitations be tapped on the outside, the ants swarm out to fight the disturbers of their peaee.

It is possible that the ants are responsible for the formation of these strange wind instruments. Schweinfurth gives a weird deseription of a concert in one of these aeaeia groves around Fashoda (now Kodok) where "the voices of a thousand flutes give out their hollow dirge."



The thorns of the *Acacia fistulosa*.

The umbrella shape of the thorn trees and their leaflessness protect them against the tornadoes whieh oeeasionally sweep over the Nyika. The most marked reduction of leaves is seen in the acacias, for they beeome mere spines, or needles, the fleshy tissue being lost, and nothing but the vaseular bundles persisting. An acacia-grove has been aptly described as a "thornorehard." In extreme instanees respiration is effected by the green succulent stems of plants. In the big leaves of the aloe and sansevieria there are few stomata.

The ekirikiti tree, *Erythrina tomentosa*, possesses formidable thorns; for this reason as well as for its quick growth the Baganda use it for making hedges round their compounds. It is common in Uganda and usually bears flowers and leaves at different seasons. The red flowers are exquisite, brilliant, and conspicuous on the bare branches. This tree is considered a charm among the Kavirondos, and in some tribes the bean-like seeds are used as beads for making necklaces. The fruit is in the form of a pod.

The word scrub is often used to describe East African scenery. Scrub consists of thorny acacias with flat tops and white stems, which in dry weather are gaunt and bare-looking, like the handle and ribs of an inverted umbrella. Between these stunted trees the ground is covered with tall, dry, yellow grass. In the rainy season the aspect is changed. The trees are leafy and covered with creeping plants which burst into flower and, for a short time, convert the plain into a paradise. The courses of rivers are marked by trees rich in foliage and flower, standing out of an abundant green vegetation and haunted by all sorts of birds and wild animals.

The Euphorbia illustrates modifications of vegetable structure adapted to thrive in countries subject to prolonged droughts. The Candelabra Euphorbia is very common in East Africa, where it may attain a height of thirty or even fifty feet. It has a round thick stalk or stem, from which oddly jointed branches spring and curve upwards like the arms of a candelabrum. Each segment has four prominent ridges. In the rainy season flowers appear along these ridges; they are sessile and alternate with the prickles. The segmentation of these branches resembles a scorpion's tail. The branches when broken across exude an acrid, milky sap (latex). The *Euphorbiaceæ* possess large latex or milk cells. The latex contains gum resins which quickly coagulate on exposure to the air. Caustic

and poisonous latex in plants is supposed to be useful by being obnoxious to their enemies, and serving by its coagulability as an efficient covering to a wound when the plant is injured. It is more probable that it is a reserve store of nourishment to be drawn upon in the dry season. There is a curious fascination about these euphorbias. It is weird to see half a dozen of

The leaf of a Willow (Salix) with two stipules.

them growing near the edge of a cliff resembling a row of candelabra standing along the choir stalls of an English cathedral. In many instances the euphorbias are overrun with creeping plants, especially those of the convolvulus order; when these are in flower the resemblance to a candelabrum decorated for Easter services is very striking.

The spider-like euphorbia is a weird and curious

plant: it is used, especially in Uganda, for making hedges. The tree-like euphorbias fill in Africa the place supplied by the cactus in Central America, and they are used in the same way for fencing estates and gardens; slips from them easily take root. Euphorbias are often seen forming isolated clumps in districts where trees are scarce or absent, because their milky trunks and branches preserve them against grass fires which quickly destroy their woody neighbours.

Some of the euphorbias are prickly and the spines are arranged in groups of three. The middle spine, usually larger than its lateral companions, is often absent. Morphologically the three spines represent a leaf and two stipules. For example, at the base of the leaf-stalk of a willow (salix), there are two stipules; in the case of the euphorbia the large central spine is a modified leaf and the smaller lateral spines represent the stipules. The thorns are easily detached. I have examined many branches on many euphorbias, young and old, without finding the middle spine: the lateral prickles are very constant.

The candelabra euphorbias will grow in places where trees would die from heat and drought. It is, however, useful to remember that young trees and bushes flourish under the protection of euphorbias, and in due time the trees and bushes grow and stifle their protectors. It is also a fact that a forest cannot arise without the aid of bushes, as they protect the young trees from being nibbled and destroyed by grazing and browsing mammals.

The consideration of the candelabra euphorbia leads to another matter of deep interest. Many parts of East Africa are covered with forests; the tangle of bushes, creepers, and trailing plants is so dense that such forests are impenetrable unless the traveller follows the tracks made by large game, or has a pathway cut by axes.

After leaving the thick forests of the Mau escarpment the scenery downwards to the Victoria Nyanza under-

goes a complete change. Trees are no longer crowded; they are free from creepers, and differ in character from those found in thick forests. Acacias, the sausage-trees, and the candelabra euphorbias constitute the prevailing

The Candelabra euphorbia.

species. The ground is usually covered with tall grass. The general aspect of such districts is only comparable to that of a well-kept English park. Nearly everyone who has written on Eastern and Central Africa refers to districts of this kind with isolated trees, or clumps of trees, diversified with euphorbias, as being park-like.

Moore, in his interesting journeys in and around Lake Tanganyika, points out that park-lands of this character cover immense areas in the interior of Africa. He also makes the following shrewd observation :—In England the existence of a park implies the operations of park-keepers, or gardeners, to keep the trees free from brambles, briars, and similar bushes. In the natural African parks there are no keepers, but the park-like character of these districts is well maintained. From a careful review of the subject Moore shows that these park-lands do not occur on hill-sides or upon rocky ground : They are invariably found on alluvial plains, or upon old lake deposits ; that is, on flats made up of blown sand, or ground of aqueous origin. An African park-land is a phase in a series of changes which follow the retreat and drying up, or the change in position of water on the face of the land. The production of an African park marks a phase in a gradual physical change. When a lake contracts within its own bed, or the positions of its shores are changed by other means, the exposed floors of mud and alluvium become first desert steppes, then steppes covered with grass and young euphorbias, then plains covered with euphorbias and bushy patches of trees, then park-land, and finally complete forest, in which the euphorbias become buried in the bushes which they originally sheltered.

It is a remarkable fact that all the lakes in the western as well as the eastern arm of the Rift Valley exhibit clear signs of shrinking. So far as the eastern arm is concerned it is a simple observation to determine that each lake has been far more extensive than to-day. Probably it is due to some slow physical alterations in the land, and the forces producing them are acting to-day. Moore suggests that the relations of euphorbias to park-lands could be made to throw light on the matter. Euphorbias have a definite average rate of growth, and if this rate could be determined, it would be possible to speak with some certainty about the time occupied by

the changes which have brought a particular park-land into existence.

The euphorbias also play a great part in the production of these park-lands, for these plants arise from seed conveyed by birds: under the shadow of the euphorbia, plants and grass flourish and in this way get a footing on the land. In time individual patches increase in size and coalesce until the whole flat is covered with euphorbias, grass, and trees.

Many parts of the British East Africa Protectorate are covered with dense forests which have never been thoroughly explored. In the Kikuyu country, when the natives wish to extend their "shambas," as the cultivated tracts are called, they set fire to the grass. Such fires do not simply destroy the grass, but the bushes and young trees, as well as those of moderate growth. In consequence of this thoughtless destruction the Wa-Kikuyu are already suffering badly, for in many districts the women upon whom the duty devolves of obtaining wood often make long journeys, sometimes four and five miles, in order to obtain a supply of firewood.

The trains on the Uganda Railway and the steamers on the Victoria Nyanza use wood as fuel. At the present time there is no sign of diminution in the supply, but when the enormous quantity required for this purpose is kept in mind, it is clear that steps should be taken to supply the waste by judicious planting.

The Kigelia is a curious tree, and one sure to attract the traveller's attention. It is found everywhere in Eastern Ethiopia. It is a big tree with bark of a cold stone-grey, and its leaves are similar to those of a walnut. The flowers are tulip-like, reddish-purple or yellow, and grow on pendants from two to six feet in length. The seed vessels hang on the long stalks and are one to two feet in length; they have rounded ends and are as big as German sausages. In-

deed, the tree looks as if it were decorated with these familiar things, and is called by the settlers the "sausage tree." Hanging on their long stalks the fruit reminds

The Kigelia tree. The seed vessels hang on long stalks and are as big as German sausages. Europeans call it the "sausage tree."

an Englishman of the big weights of a "grandfather eloek." The Wa-Kikuyu use the rind of this fruit to flavour the pombe (native beer). The natives in the Rovuma valley regard it as a eharm and hang it outside

their huts (Weŭle). The little girls of the Masai make their dolls from this fruit. Some native tribes use the fruit to make bottles, pans, cups, ladles, and other domestic articles. The wood is sometimes employed to make frames for drums. The natives of Central Africa hollow out the fruit and use it as a mouse-trap and bait it with roasted maize or ground-nuts; a noose arranged at the mouth of the trap is kept open by a bent stick (Werner). Schweinfurth expressed the opinion that the Kigelia in appearance may bear comparison with a majestic oak. It occupies the place of nut trees, such as the walnut and chestnut.

An interesting feature of the flora of British East Africa is the number of European plants it contains. I was surprised in the Kikuyu country to find brambles, blackberries, clover, forget-me-nots, clematis, geranium, heath, ranunculus, violets, thistle, St. John's-wort, bracken, rue, and the stinging-nettle.

The tall trees commonly referred to as cedars and used extensively for fuel on the railway are junipers; they have tall, straight trunks, and grow to a height of one hundred feet. The presence of so many forms of northern plants in the equatorial tracts of East Africa was a subject of comment by Sir J. D. Hooker in his interesting remarks, which form an appendix to Thomson's account of his journey through Masailand. Many of the trees growing on the island of Mombasa and the adjacent coastlands have been introduced by the Arabs. This refers to such trees as the Mango, Papaw, Jack-fruit, orange, lemon, pomegranate, and pine-apple.

The presence of so many species of plants in the highlands of East Africa common to northern countries, especially Europe, may in part be explained by the migration of birds. That birds play a part in the dispersal of seeds has long been recognised. Seeds, especially those invested by a hard capsule, will germinate after passing through the alimentary canal of birds.

Such seeds are scarcely likely to remain long enough in the gizzard to allow their transference from Italy to Uganda. Darwin's interesting experiment of raising eighty-two plants from seeds casually mixed in a ball of earth on the leg of a partridge is more to the point. It is easily conceivable, when we reflect that many European birds regularly migrate to the Ethiopian Region in the winter. European birds, such as storks, cranes, cuckoos, nightjars, ducks, pigeons, quails, and swallows are common. It is scarcely doubtful that seed-containing mud, acquired by the feet and beaks of birds in the fields and pastures of Southern Europe, is conveyed by these swift messengers. When such mud is deposited in districts where the climatic conditions are favourable, the seeds it contains germinate and reproduce their kind.

It is an established fact that birds find their way from Europe into Africa. It has been proved experimentally. When Slatin was the prisoner of the Kalifa in Khartoum (1883–1895) a crane was killed at Dongola. This bird had a cartridge case on its neck containing two small papers with an inscription, written in German, French, English, and Russian, stating that the bird had been brought up on an estate in South Russia. The Kalifa, thinking it might be secret intelligence, had Slatin brought into his presence to translate the writing. After the matter had been explained to the Kalifa, he regarded it as "one of the many devilries of those unbelievers who waste their time in such useless nonsense."

Moore, J. E. S. ... ... *The Tanganyika Problem.* London, 1902.
Roosevelt, T. ... ... "African Game Trails," *Scribner's Magazine.* 1910. XLVIII., 20.
Schweinfurth ... ... *The Heart of Africa,* 1868 *to* 1871.
Schillings, C. G. ... ... "With Flashlight and Rifle," *In Wildest Africa.*

XXI

HORNS

On entering the house of settlers, the halls of hotels, the billiard-rooms of clubs and similar places in British East Africa, the first thing that arrests the attention of visitors is the display of horns, especially those of antelopes. In a large collection there are, as a rule, the horns of a rhinoceros.

Horns usurp the place occupied by pictures in similar institutions in European cities and towns : they are usually attached to the walls of the room, or the verandah, by means of that portion of the skull from which they grow. In many specimens the horns with their sheaths remain attached to the skull ; in others the skin of the head and neck is preserved and carefully stuffed. It is not common to find stuffed heads, because the ants soon destroy the skin.

In order to appreciate the significance of these hunting trophies, those who visit Eastern Ethiopia should devote their attention to horns in general.

Among mammals, horns are of four kinds :—

(*a*) Solid horns or antlers like those of deer.

(*b*) Hollow horns which decorate the heads of oxen, sheep, goats, and antelopes.

(*c*) Solid skin-covered horns which exist in giraffes.

(*d*) Cutaneous horns, such as grow on the nose of the rhinoceros and the tail of the elephant.

Antlers, which are such conspicuous features on the heads of the red and the fallow deer so common in

Europe, need not detain us long, for deer are not found in Africa. Structurally, they are outgrowths from the frontal bone, and consist entirely of bone. During their growth, antlers are covered with skin beset with hairs and sebaceous glands; the skin covering an antler is continuous with that on the deer's head; so long as its antlers are covered with skin, the stag is said to be "in velvet."

Antlers in this condition are sensitive to knocks and blows, but when full-grown the velvet peels off and the bare bone remains. Peeled antlers are insensitive, and the bucks use them to fight rivals. In fighting, the antlers are used with such violence that a tine or occasionally the beam is broken. At the end of the rutting season the antlers fall off, and are annually renewed. In the majority of deer it is the buck alone which is ornamented with horns.

The rapidity with which antlers grow is astonishing. The Wapiti (*Cervus canadensis*) has antlers weighing thirty-two or more pounds, yet these huge masses of bone are reproduced in five months. In the Zoological Gardens during the growth of the antlers it is usual to double the wapiti's allowance of food.

Horns of the second kind are characteristic of the Family *Bovidæ*, which comprises oxen, sheep, goats, and antelopes. These animals are sometimes called the sheath-horned ruminants, because their horns consist of a core of bone connected with the frontal bone, covered with a sheath of hard material derived from the superficial (epithelial) layer of the skin. This horny sheath corresponds to the velvet of the deer's antler, but it is insensitive. Mammals possessing such horns are sometimes spoken of as the Cavicornia or Hollow-horned. These horns differ from antlers in the fact that they are never shed and never branch.

The horns of antelopes present great variety in shape and size. They are also useful to the zoologist for the purposes of classification.

The Skull of an Antelope.

The sheath has been removed from one horn in order to display the core and show its connection with the frontal bone. (Museum, Royal College of Surgeons, England.)

The horns of antelopes form two groups: (1) Spiral or Corkscrew horns, and (2) Annulated horns.

(1) *Spiral Horns.*—Corkscrew horns vary much in

different species of antelopes. In the marshbuck the spiral is wide and long (p. 34). The horns of the bushbuck are not unlike an old-fashioned two-tined fork with twisted tines. In the eland the horns are parallel and the twist is close and tight; in the kudu and the bongo the spiral is open and graceful, notwithstanding the thickness of the horns in proportion to their length. The horns in the young eland bull are straight, and betray no sign of twist. The forces which determine the spiral growth of antelope's horns are unrecognised, and this applies equally to the formation of the rings on "annulated" horns and the "crumpling" of the horns of oxen. In this group horns are usually restricted to the males, and they are not ringed. Among elands the horns of the cows are longer than those of the bulls.

(2) *Annulated Horns.*—These possess transverse ridges or rings. Such horns are seen in the hartebeest, the oryx, the eobs, the reedbucks, roan antelope, gazelles, and duikers. Among antelopes with annulated horns the females, as a rule, are similarly decorated, but the horns are smaller than those of the male.

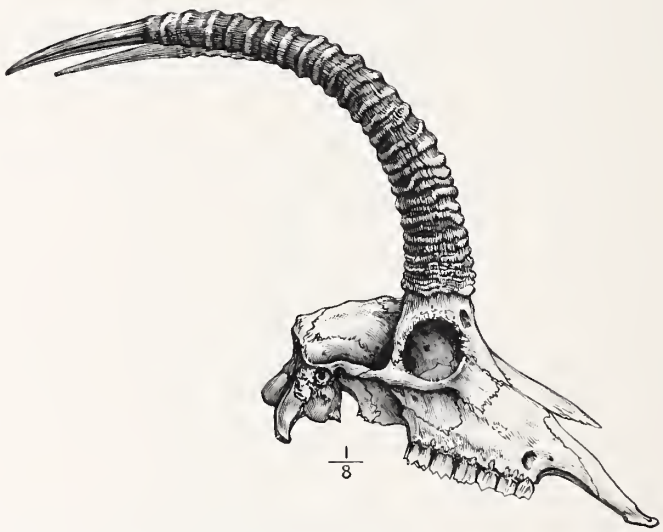
There is one curious antelope with horns of such an odd shape that it will not fit into either of these groups, namely, the wildebeest or gnu. In regard to this weird animal, with horns more like those of the buffalo than the other members of the antelope section of this great family, it is noteworthy that in the young gnu they grow out like spikes and subsequently assume the odd shape seen in the adult animal (p. 301).

The annulated horns of antelopes differ in an extraordinary way in shape and in the relation of the horns to each other; they also vary enormously in size in different animals of the same species.

The horns of the oryx are almost straight and nearly parallel to each other. They are much prized by hunters. Sometimes they attain a length of thirty-six

inches in the Beisa oryx. In a fight these horns are as formidable as bayonets.

The horns of the reedbuck stand up almost vertically from the head, and their tips are turned forwards like a hook. The duikers have horns which are dainty and straight, though their surfaces are annulated; they hardly exceed in thickness the handle of a pen. The horns of the gazelles and the cobs assume the shape



The Skull of a Roan Antelope showing the mode in which the horn cores arise from the frontal bone above the orbits. (Museum, Royal College of Surgeons, England.)

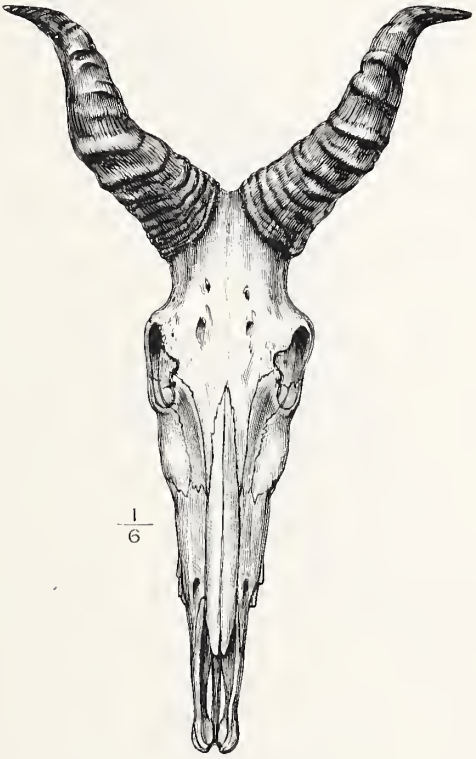
of a lyre (lyrate): whilst those of the roan antelope form a graceful backward curve.

The horns of the cobs diverge from each other as they leave the skull and converge towards the tips: these horns are also curved in such a way that the concavity is directed forwards and upwards. In the grandest cob, the water-buck, the horns often attain a length of thirty inches.

The horns of the roan antelope rise from the frontal bones immediately above the orbits and arch back-

wards over the neck in a graceful curve. These horns are thick ringed and sometimes measure forty-five inches in length.

The hartebeest has horns of curious shape, and it is the most grotesque of all antelopes. It has a long



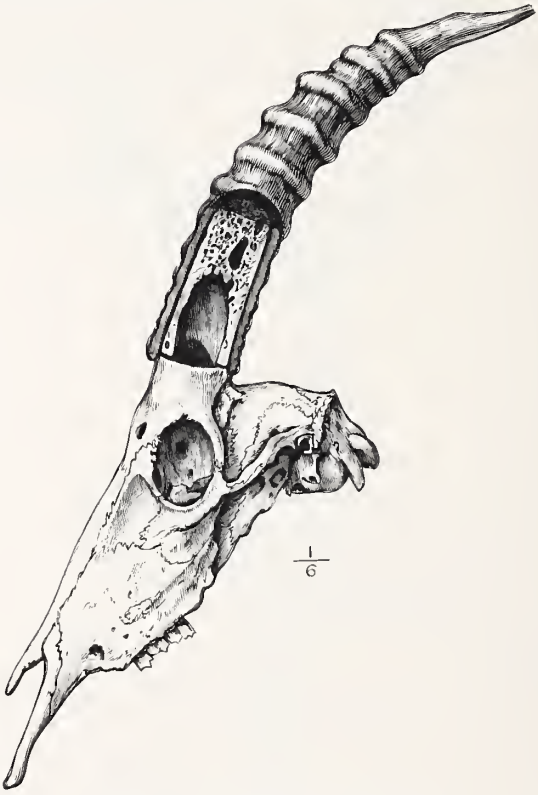
The Skull and Horns of a Hartebeest.

narrow skull, and the narrowness is accentuated by a thick ridge of bone which rises from the frontal bone, just above the orbits, and forms a pedicle for the horns.

As if to bridge the gap between the peculiar annulated horns of the hartebeest and the curious downward curving horns of the gnus, we have the Topi, the

nearest ally of the hartebeest, bridging the gap between gnus and the rest of the antelope sub-family.

In all antelopes, indeed in all the bovine family, the horns arise in connection with the frontal bones. It is



The Skull of a Bubaline Antelope.

The horn is shown in section in order to demonstrate that the frontal sinus extends into the base of the horn core. (Museum, Royal College of Surgeons, England.)

also well known that those portions of the frontal bones which are in relation with the nasal fossæ are hollowed out by extensions of the nasal chamber; these spaces, known as the frontal sinuses, contain air and are in direct communication with the nasal fossæ. The air-

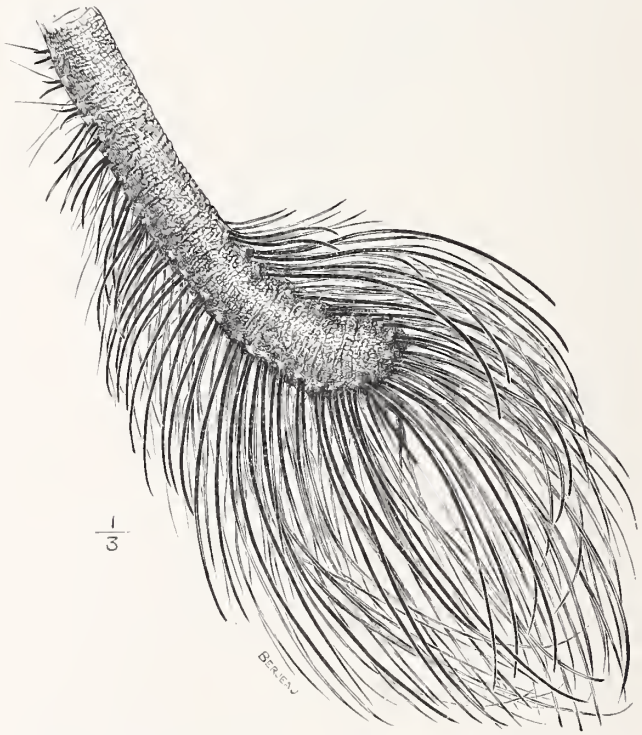
spaces in the frontal bones are absent in young animals, and appear gradually with the growth and development of the facial and cranial bones. The formation of the horn core is a post-natal event, and as the air sinuses extend into the frontal bone in some antelopes they involve the base of the horn core; the extent to which it is permeated depends on the age of the animal. The pedicle, or bridge, which forms the support for the horns of hartebeests is quite hollow. This is also true of the horn core of the topi. The large horn-cores of the kudu and oryx are solid. The museum of the Royal College of Surgeons contains some specimens, obtained from Sir Victor Brooke's collection, which specially illustrate this point. Also some sections of horn-cores from oxen, so permeated with sinuses as to appear on section like honeycombs.

The horns of the rhinoceros, as its name specifies, grow on its nose: they contain no bony core, yet that portion of the nasal bone which underlies the horns of these huge and ugly beasts has a bony projection, but it does not enter into the composition of the horn, for this part of the rhinoceros is formed from the superficial (epithelial) layer of the skin which undergoes a change termed by physiologists, keratinisation, which means that the part becomes converted into horn. As a matter of fact the horns on the nose of a rhinoceros are from an anatomical point of view a mass of agglutinated hairs. Sir John Willoughby shot a rhinoceros in East Africa (1889) with three horns in a row, one behind the other. The skin with the horns on it was shown at a meeting of the Zoological Society, London.

Of the two horns the front one, that nearest the animal's snout is usually the longer, it rarely exceeds a foot in length, but some examples have measured as much as forty inches. Rhinoceros horn is used for making handles for walking sticks and umbrellas, it is easily cut with a knife and if a fragment be soaked in

weak caustic alkali solution it will soften and flake in the same way that our finger nails and patches of hard skin soften under the influences of soap and water.

There is one use the rhinoceros has for its horn, and



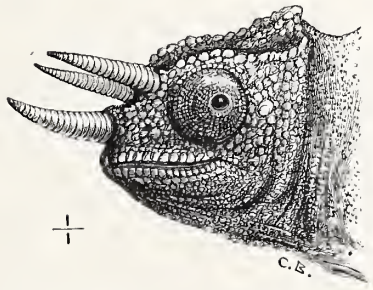
The tail of an African elephant. The hairs are compound, and similar in structure to the nasal horn of the rhinoceros.

that is probably peculiar to it. After dropping its dung the animal turns round and charges the heap with its horn and wrathfully tosses the dung about; sometimes ploughing up deep holes in the ground with the nose and horn during this weird performance. Selous states that this applies to every prehensile lipped rhinoceros irrespective of the length of the posterior

horn. The square mouthed species does not indulge in such antics, but when a small calf accompanies its mother, it always runs in front and she appears to guide it by holding the point of her horn upon the little animal's rump. Selous further states that in all sudden changes of pace from a trot to a gallop, or *vice versa*, the same position is always exactly maintained.

The African elephant has a number of horns but they grow around the tip of the tail: though commonly called hairs, they are hard like strips of whalebone. Shattock examined the microscopic structure of these so-called hairs in 1896, and found them to be agglutinations of hair-like structures such as compose the horns of the rhinoceros.

The long front horn of the rhinoceros is sometimes fashioned into sticks to beat cattle and goats, and occasionally it is made into clubs for Masai orators and councillors. In the south-west of Kordofan the natives have a tradition that anyone who drinks out of a cup made from a rhinoceros horn never gets sick. In some parts of the East such cups are supposed to neutralise poisons poured into them.



The Head of a Chameleon with three horns. (Natural History Museum.)

XXII

ANTELOPES

Antelopes are almost as peculiar to the Ethiopian Region as Marsupials are to Australia. In East Africa they occupy the plateaus and grassy plains in thousands, but are becoming less abundant as the country is opened up by European settlers. Some of the big antelopes, especially the kudus, have diminished in number since 1890; when the rinderpest destroyed these magnificent animals wholesale. Buffaloes and gnus also suffered badly in this epidemic. Antelopes belong to the family *Bovidæ*, which contains oxen, sheep, and goats. So far as the external characters of these animals are concerned the chief distinction between them and the deer family (*Cervidæ*) is the horns. An antelope is an easily recognised animal, but there is scarcely any term less easy to define than antelope. To-day it is applied to any sheath-horned ruminant not coming under the designation of ox, sheep, or goat. The term has a popular but not a scientific significance.

That Africa is the headquarters of antelopes may be gathered from the fact that out of thirty-five genera no fewer than twenty-four are African. In the course of a journey from Mombasa to Uganda an observant traveller will note examples of a dozen genera of these interesting and beautiful mammals.

In describing them I shall follow the classification adopted in the catalogue guide published for use in the Natural History Museum, London.

Those which come nearest the sheep and goats form the interesting subfamily Tragelaphus, or goat-like antelopes. These are beautiful animals possessing spiral horns without rings ; long tails, and small face glands. In many the ornamentation of the skin takes the form of vertical lines and rows of spots.

The best known forms are :

Cumming's Bushbuck	... *Tragelaphus roualeyni.*
The Bongo	... *Böocercus euryceros.*
Speke's Antelope ...	... *Tragelaphus spekei.*
Greater Kudu	... *Strepsiceros kudu.*
Lesser Kudu	... *Strepsiceros imberbis.*
Eland	... *Taurotragus oryx.*

In reading works dealing with deer and antelopes reference is often made to what are called face-glands. These are pits, pouches, or deep folds of the skin of the face immediately below the inner corner of the lower eyelid. The skin forming this pit is beset with glands, and when the animal is excited, an unctuous fluid exudes from them ; sometimes the pit opens and resembles the nostril of a snorting horse. In some antelopes, especially the oribi, the face glands are large and occupy deep depressions in the facial bones below the orbits. The glands are conspicuous when the animals are sexually excited. The secretion in some species is black. According to Elliot, the face-glands of the Gerunuk have a small opening, and the black secretion which issues from them stains everything it touches, like ink.

Bushbucks or Harnessed Antelopes are common all through British East Africa, but there is great variation in their colouring in different localities.

The bushbuck is about thirty inches high at the shoulders and weighs 150 pounds. The horns resemble a two-tined fork the prongs of which have twisted so as to form an open spiral ; a good pair will measure about twenty inches over the curve. The female is hornless. Bushbucks are usually found in thick bush in the neighbourhood of water.

Bushbucks are shy animals, and dart quickly in and out of thickets. At times they lie close in cover. They are difficult to shoot, but their flesh is very tender and delicious. When travelling along the Uganda Railway I often saw these antelopes jumping away from the line in a nervous, excited style. In

The Bushbuck. Scarlet runners and French beans are irresistible attractions for this antelope.

Kampala I saw one quietly feeding in a garden within twenty yards of a house inhabited by Europeans. Jackson states that French beans and scarlet runners are irresistible attractions to them.

The Bongo is a big antelope standing four feet at the shoulder; it is something like a bushbuck, but is more brilliantly coloured and has a tufted tail. Both sexes have horns, and those of the male are massive, spirally curved, and nearly a yard long. It was dis-

covered by Du Chaillu in the Gaboon, Africa; nothing was known of its existence in East Africa until Mr. Isaacs discovered it in the dense recesses of the Mau forest.

The Bongo of the Mau Forest. (Natural History Museum.)

It is worth repeating that "from Africa always something new." A few years ago the forests of the Congo furnished us with that remarkable mammal the okapi, and from British East Africa comes quite unexpectedly another four-footed and hugely-horned animal the bongo. Few Europeans have seen a living

example, but its horns and beautifully striped bright-coloured skin occasionally adorn the walls of settlers' houses. This antelope has been rarely hunted because it lives in the densest parts of the Mau forest, and possesses extremely sharp ears and eyes. Most of the skins which are available have been obtained from Ndorobo hunters. Bongos "do not graze but browse, cropping the leaves, flowers, and twigs of various shrubs, and eating thistles" (Roosevelt).

Kudus are very handsome antelopes. There are two species, the Greater Kudu (*Strepsiceros kudu*) and the Lesser Kudu (*Strepsiceros imberbis*). They are allied to the bushbucks on the one hand and the elands on the other. The horns of the kudus have more twists than those of the bushbucks, and the spiral is more open than that of elands. Horns are absent in the females. The Greater Kudu has a mane of hair extending along its throat as well as a dorsal mane along its nape and withers. The tawny coat of this magnificent animal is marked with narrow vertical white stripes. It prefers hills covered with thickets, but it is also seen along the banks of rivers as well as in thorny jungles on the plains. Kudus are met with in pairs or in small parties. On looking at its horns, which may measure five or six feet along the curve, one thinks that they would be in its way when scampering through low trees and brushwood. Under such conditions the kudu lays its horns flat on its back and rushes without hindrance through the thickets to escape its enemies.

The Lesser Kudu has no long hair on its throat, hence its name *imberbis* (beardless), and the horns form a closer spiral. It has not the wide range of the Greater Kudu, being confined to East and North East Africa. These animals are difficult to shoot on account of their peculiar coloration and the thickness of the bush in which they live and where they love to lie in the heat of the day.

The Greater Kudu exists around Lake Baringo, and a good specimen shot by Powell-Cotton in 1893 stood five feet nine inches at the shoulders and weighed 654 pounds. Kudus must be fairly abundant in Somaliland, if one may judge from the number of horns of these

The Greater Kudu is a magnificent antelope.

antelopes offered for sale by natives at Aden to the passengers on the great ships which call there. This may account for the frequency with which their horns are met with as trophies in British East Africa, although the animal itself is rare in that Protectorate.

Elands, the largest of all antelopes, are distinguished by their horns, which present a closely-set spiral near the base. The cows have horns which are usually longer

than those of the bulls. In the young animals the horns stick up as plain spikes. The longest pair of cow eland horns obtained by Selous measured 2 feet 10 inches; this hunter also states that the horns of very old bulls are often worn down to a little more than a

Elands (*Taurotragus oryx*). Bull and bull-calf. The horns are at first straight spikes.

foot in length. A big eland will occasionally attain a height of nearly six feet at the withers and weigh over 1,500 pounds. Its flesh differs from that of most antelopes as it contains a fair amount of fat. The Masai will eat the flesh of the eland as they consider it to be

like beef, but they disdain the flesh of antelope. Many settlers esteem eland beef, but it is very much overrated. One enthusiastic writer considers "a cut from the brisket fit for a monarch," but this would of course depend upon the condition of his majesty's appetite. A settler near Lake Elmenteita informed me that a herd of eland crossed his farm twice yearly on the way to the crater of Menengai ; he looked out a fine bull, and after shooting it pickled the flesh for his own consumption and regarded it as beef.

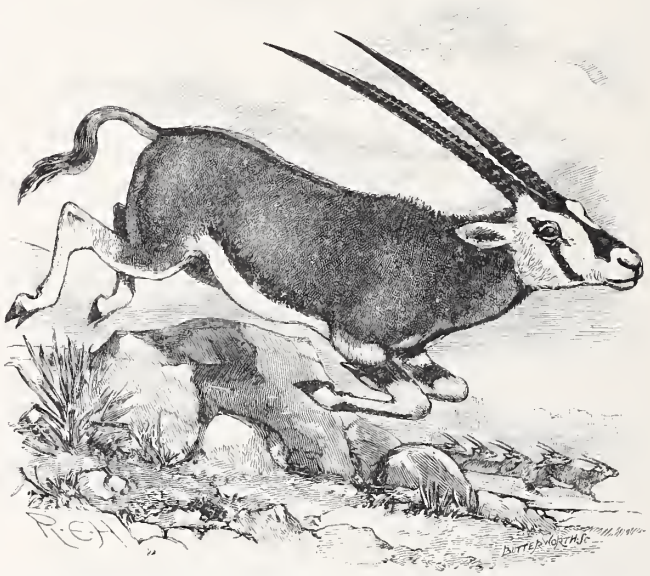
Many attempts have been made to acclimatise elands in the British Isles : they breed in the Zoological Gardens. In the Kikuyu country I saw a young eland bull running with cattle, and at Njaro an eland bull six months old in a pen with calves. In South Africa the eland is almost extinct, in East Africa the number of this antelope is rapidly diminishing. Elands are found on grass plateaus and in wooded districts, on hills and on plains.

The Roan and Sable antelopes belong to a genus which has no popular name. Zoologists term them *Hippotraginæ*, which may be rendered Horse-Antelopes : it is an apt name. The Roan antelope is a handsome animal standing four feet high at the withers furnished with large gracefully-curved horns. Its colour is a rich dark glossy brown, and there are white stripes on the face : the belly is white, and there are four teats like oxen. The muzzle is hairy and the tail long and tufted. Roan antelopes frequent wooded uplands in herds including ten or twenty individuals. These animals are endowed with great speed and staying powers, and are dangerous to approach when wounded.

The Oryx is a well-known antelope distinguished by long straight horns which slope backwards, and lie more or less in the plane of the face. Oryx antelopes are found throughout the desert tracts of Africa, generally in herds ; old males sometimes separate from the others. They flourish where vegetation is scanty. The East

African form is known as the Tufted Beisa (*Oryx callotis*).

The oryx is a beautiful antelope and stands four feet at the shoulders and weighs from 400 to 450 pounds. The horns, which sometimes attain a length of three feet, are annulated in the basal and polished in the



The Beisa Antelope (*Oryx beisa*). This antelope is independent of water and flourishes where vegetation is scanty. When a herd of oryx is on the march their long horns produce an appearance not unlike a regiment of soldiers marching with fixed bayonets.

terminal half. The horns of the female are thinner and apt to be less symmetrical than those of the male.

When wounded or brought to bay the oryx is a bold antelope, and must be approached with caution, for he will sweep the ground with these long horns in a determined fashion. The oryx can go without water for a long period, depending on the heavy dew for moisture.

The Beisa antelope is also met with in East Africa,

but this species is more common in Somaliland, where the male oryx is hunted especially for its hide, for this is particularly thick over the withers and is used on this account for the manufacture of Somali shields.

Chapman witnessed a fight between two oryx bulls at Baringo where these antelopes are plentiful, and states that they "sparred with their rapier-like horns, each seeking to gain the other's flank." He succeeded in shooting the victor; the hide was scarred with wounds from a score of fights, and in the skin of the neck, which was nearly two inches thick, Chapman found an encysted bullet. The hide of the cow in the same situation is comparatively thin. When a herd of oryx antelopes is traversing tall grass their long horns produce an appearance not unlike a regiment of soldiers marching with fixed bayonets.

The natives of Ethiopia in their arts and crafts make good use of material derived from the horns and skins of antelopes. The hides furnish them with a covering for their bodies, shields and drum-heads. Useful thongs are cut from the hides of elands to tether and bind cattle. The sheath of the kudu's horn and of the marshbuck make excellent trumpets and the convolutions emphasise the sound. Blasts from such trumpets can be heard afar, in warfare, and on ceremonial occasions; or to call the people together, to guide them when

Horn Sheath of the Greater Kudu. The Masai use it as a trumpet when they move their kraal so that no one shall lose the way.

"on safari," and to sound an alarm. Blowing the trumpet is a very ancient method for calling assemblies, preventing straggling on the marsh, and for sounding alarms. Trumpets made of silver were used for this purpose by the Israelites when journeying in the wilderness. (*Num.* x. 2.)

The small horn-sheath of steinbucks or duikers are made into whistles, and portions of the horn-sheaths of the oryx make tobacco boxes. The horns of buffaloes and oxen are made into boxes and serve as receptacles for the "charms" of the medicine man, and for grease. Kikuyu belles sometimes encircle their waists with girdles made from the toe and finger bones of small antelopes.

XXIII

GAZELLES

The Gazelles form the largest genus of the Antelope subfamily. Among the characteristic features of gazelles should be mentioned the ringed and often lyrate horns; the presence of face-glands (tear-pits) and a short tail. They are of moderate size in comparison with other antelopes, sandy-coloured with white bellies, dark stripe along the flank and, as a rule, dark face-marks. Gazelles possess one feature impossible to describe either in prose or poetry, the beautiful limpidity of their eyes. They inhabit open and more or less desert districts, but in the "rolling seas of grass" of the Rift Valley they abound in vast numbers; their sandy coloured coats harmonise well with the tall yellow grass which grows abundantly in the districts frequented by them. Species-making zoologists have endeavoured to separate some of the East African antelopes from the well-known species living in South Africa. When the supposed distinctions come to be critically examined they fail, and in many instances amount to little more than variations in tint.

Naturalists and others interested in the effects of environment on the evolution of animal form and colour, will be perplexed in Eastern Ethiopia to decide whether the abundance of a particular species of antelope depends on its adaptation to a particular environment, or whether they flourish in such favour-

able surroundings because their own coloration was suitable to that district. There are no means of deciding whether a species became differentiated in the district in which we find it, or has wandered to that part from its original home.

The pretty antelope named after Joseph Thomson, who discovered it during his journey through Masailand to the Victoria Nyanza (1883), is abundant in the country between Kilimanjaro and Lake Baringo; its northern limit lies a few miles above Lake Nakuru. Both sexes possess horns; they are larger in the buck than in the doe (p. 16). Usually these gazelles run about in herds of ten does and one buck, but larger companies are seen, sometimes consisting of fifty animals. In districts where they have not been worried by sportsmen they are easy to approach. When much shot at they are wary and cautious and as they run, or intermingle with herds of other animals, give the alarm. Everyone who has made a careful stalk towards game has suddenly been annoyed by a "Tommy" jumping along wagging his tail and warning all the animals in the neighbourhood. The almost constant agitation of the tail is peculiar to this antelope. Thomson's gazelles have never been brought alive to the Zoological Gardens, but they thrive in confinement in British East Africa.

When Captain Grant accompanied Speke on his memorable journey to the Victoria Nyanza in 1863, he discovered a beautiful gazelle which has been named after him. It is common on the grasslands of the East Africa Protectorate and often runs with Thomson's gazelle. Both sexes of Grant's gazelle are horned; the horns of the buck are large, handsome, and more or less lyriform. They are thirty inches in length. Some examples of this antelope weigh 150 pounds. Among a herd of zebra, oryx, hartebeest, or giraffe Grant's gazelle is a useful outpost and gives timely warning of the sportsmen's approach.

A graceful antelope, the Impalla (or Palla), widely distributed through British East Africa, is common in open bush and thinly wooded districts near water. Its horns are ringed and lyrate: they spread evenly and are only possessed by the male and may attain a length of thirty inches following the curve. The rings

Grant's Gazelle. The horns are favourite trophies: they are lyrate, and often 24 inches and occasionally 30 inches long.

on its horns are imperfect. There are tufts of black hair at the back of the hind legs just above the foot. Each tuft surrounds an area of bare skin which is usually described as a gland. The impalla received the specific name *melampus* in consequence of the black tufts on its feet. A good sized buck will stand three feet at the withers and weigh upwards of 150 pounds. Lions and leopards take a fair toll of these antelopes and they are

a favourite prey of the wild dogs. Impalla run together in herds which may contain any number from ten to sixty.

These antelopes are famous for their powers of leaping, which is especially displayed when the herd is alarmed. They do not mix much with other antelopes but they have been seen with oryx, hartebeest, and waterbuck. When a number of impalla are scattered in an acacia grove I found it difficult to distinguish them among the trees unless they moved. Although beautiful and graceful, impallas are very pugnacious among themselves and the bucks are apparently very jealous. Dugmore states that an amorous impalla buck "is a beautiful sight," for it spreads, or displays, the long hairs of the rump, and the vertical dark streak on either side of the rosettes forms a natural border or fringes to them. The excited buck causes consternation among the herd, emitting repeated loud roaring grunts, chasing first one and then another of the does.

The Gerenuk is a very curious antelope ; it has long legs, a giraffe-like neck and an elongated muzzle. The Swahilis call it the "little giraffe." The horns, present only in the male, are massive and annulated. The gerenuk skull is so hard that it has received the specific name *lithocranius*. By itself the long-legged gerenuk appears eccentric among gazelles, but the Dibatag of Somaliland and the Addra gazelle, of the Soudan, bridge the gap between gazelles and gerenuks.

The gerenuk browses on the branches and leaves of trees and shrubs ; in order to reach the young green shoots it will stand up on its hind-legs with its fore-legs resting on the branches like a goat. When trotting it stretches its head and neck forward until these parts are nearly on the same plane as its back and they look like greyhounds. They occur in small herds of six or seven and are wary animals. It is stated that the Somalis will not eat the flesh of the gerenuk though

they eat that of other antelopes. This may help to explain the great number of gerenuks in Somaliland.

The Gerenuk (*Lithocranius walleri*).

There appears to be some doubt in the minds of zoologists whether the pretty little Steinbok of British East Africa is a variety of the steinbok so common and so well-known in South Africa. Zoologists have been acquainted with this little quadruped since the great circumnavigator Captain Cook visited the Cape of Good Hope in 1775. The males have a pair of horns nearly vertical and about $2\frac{1}{2}$ inches long, and as their generic name (raphiceros) implies they are pointed and needle-like.

Steinboks, like the duikers, are often seen jumping among the long grass in the Rift Valley: they are called "grass antelopes" by the settlers and in the tall dry grass the colour of their coats makes them invisible except when they move. They were more easily seen after the grass had been fired, for when a steinbok "bolts" out of cover, and traverses the black patches

Steinboks frequent open grass plains either singly or in pairs.

left by a grass fire, it becomes a conspicuous object and is secured with a shot gun; their curious jumping movement and great speed make them difficult targets for rifles. I was far more interested in watching the movements of these pretty antelopes than in destroying them, but they were welcome additions to the larder. A steinbok weighs about thirty pounds.

Dik-Dik or Dig-Dig is the native name of some small antelopes which prefer to live in dry acacia-

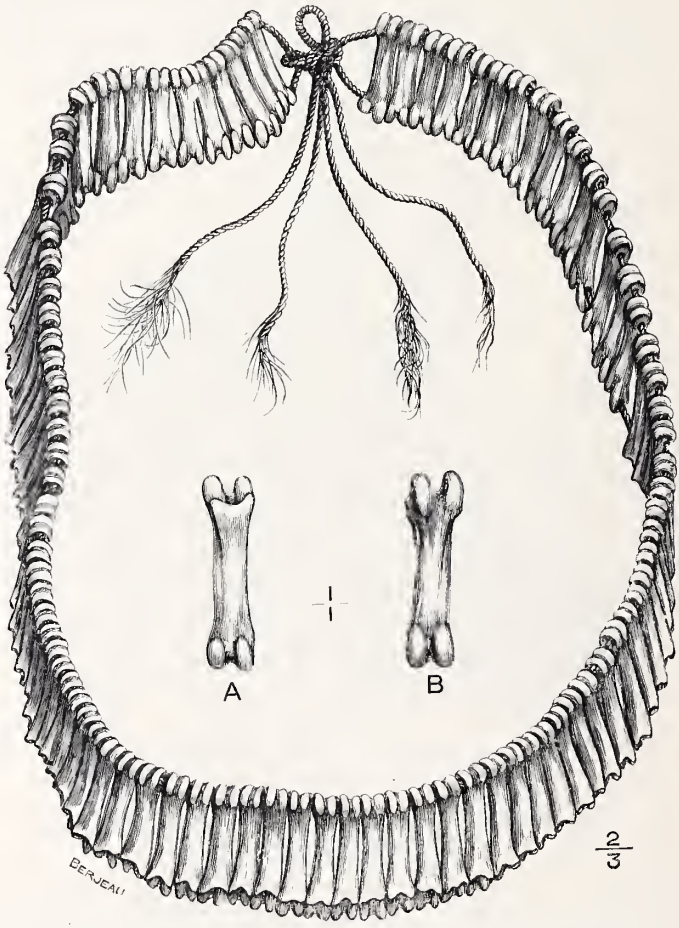
thorn bush country. They inhabit waterless parts and depend a good deal on the heavy dew for moisture, but they like the thick bushes along the banks of water-courses. They possess elongated hairy noses and a tuft of hair on their crowns: the horns are short, straight, almost vertical, and possessed by the male only.

The head of the Dik-dik, *Madoqua guentheri*.

The smallest antelope in East Africa. Dik-dik (sometimes called Dig-dig) is the native name. Its chief peculiarity is its long hairy snout and short tail.

The skull is also remarkable for the shortness of the nasal bones and the large size of the nasal chamber. The dik-diks are about fourteen inches high at the shoulders, with a body no bigger than that of a rabbit. These small antelopes were discovered by Henry Salt, who travelled in Abyssinia in the early part

of the nineteenth century. Madoque was the native name of these little animals. Several species have since been discovered and one of them, Gunther's dik-dik, is found around Lake Baringo.



A Karamojo Necklace made of the finger bones of the Dik-dik. The bones in the middle show the bone (phalanx) of natural size; A, anterior; B, posterior view.

A dainty antelope, the Oribi has been known to zoologists since 1776. It is widely distributed in the

Ethiopian region. It has a naked muzzle and a bare glandular spot below each ear, and there is a large depression in the bones for the face glands. The horns are about three-quarters of the length of the head and annulated at the base; height at withers about twenty inches. The females are hornless.

Graceful little Oribis are numerous in East Africa especially in open country. They abound in thousands on the great grassy plain known as the Guas Ngishu plateau. When disturbed they leap through the long grass and appear as "fleeting streaks of yellow."

When the grass has been fired and the young green grass is sprouting out of the black patches, the little antelopes are easily seen. John T. McCutcheon, the celebrated caricaturist of Chicago, writes :—"When the grass on the plateau is burned, the ant-hills show up like a popular cemetery without tombstones, then the landscape is alive with graceful little oribis."

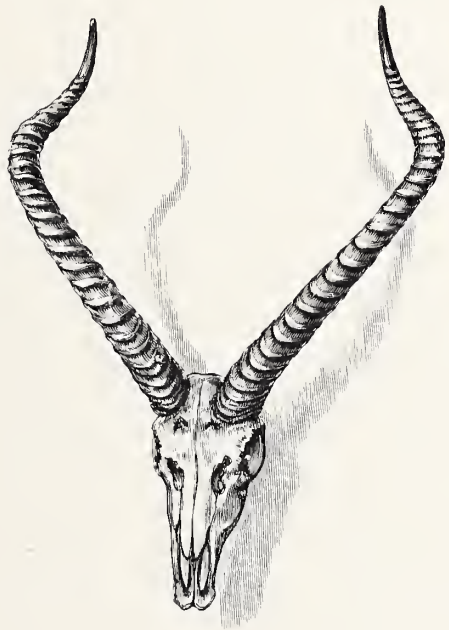
This antelope is distinguished by its comparatively small horns, which are annulated, curved forward at the tips and usually about six inches long. The females are hornless. They have a large bare glandular patch below their long ears. A good sized buck weighs about 70 lbs.

Waterbuck (*Cobus ellipsiprymnus*).

Reedbuck have a tawny yellow coat which makes it very difficult to distinguish them among the long dry grass in which they live, and move about like phantoms. They are as active among the rocks as a chamois on a mountain and wonderfully alert. We found them very abundant about Lake Nakuru and on the slopes of Menengai (see p. 169). They occur in groups of four or five.

In 1895 a new species was described and named *C. chanleri* after Mr. Astor Chanler, who sent home the skin which Mr. Rowland Ward considered to

be a new species. It is quite the fashion around Lake Nakuru to call all these animals Chanler's reedbuck. I examined several but they did not conform to the description of the type specimen. Their flesh made a welcome addition to our larder. Reedbuck do not thrive in captivity.



Skull and Horns of Mrs. Grays' Kob. This antelope was discovered in the Nile swamps by Petherick. Dr. Gray, at that time (1859) keeper of the British Museum, named it after his wife, "who assisted him in his studies."

The Waterbuck is a noble animal and equal in size to a red deer; its head and horns make a trophy much sought after by hunters. The bucks are savage fighters among themselves, and the horns of the big bucks are often damaged in fights with rivals. The flesh of these antelopes is coarse, hard, and unpalatable even for Swahili porters. The tough hide makes excellent sandals.

Waterbuck lie up in forests along the banks of rivers and feed on the open grass flats outside the belts of forest and are shy animals. They will seek refuge from pursuit in the water. Horns are present only in the males; they are annulated, long, and peculiar in shape, and often exceed thirty inches in length.

Several species of Waterbuck are comprised in the genus Cobus. Of these the largest are the common Waterbuck, *C. ellipsprymnus*, and the Defassa. The first mentioned antelope is not so abundant in East as in South Africa; it is easily distinguished by the white elliptical stripe on its rump, from which its name is derived. The Defassa is common in British East Africa and Somaliland: it is a grand animal and carries handsome horns. It is sometimes erroneously called the Sing-Sing. The Waterbuck (*C. unctuosus*), to which this name belongs, lives in West Africa. Defassa is an Abyssinian name.

The smaller species of Waterbuck are known as Kobs. There are three well-known species in Eastern Ethiopia. The Uganda Kob (*C. thomasi*); the White-eared Kob (*C. leucotis*); and Mrs. Gray's Kob (*C. maria*). All these are pretty and graceful antelopes. The Uganda Kob is very common around the northern shore of the Victoria Nyanza; the Baganda often use its antlers to ornament the prows of their boats (see p. 50). Mrs. Gray's Kob has a darker coat than is usual among Waterbuck, and its horns resemble those of the Impalla; it lives in the swamps of the White Nile.

XXIV

GNUS AND DUIKERS

Gnu is the Hottentot name of the weird antelope which the early Dutch settlers of South Africa named the Wildebeest; they regarded it as a wild form of domestic cattle.

Gnus indulge in extraordinary antics when a waggon or a horseman approaches their grazing grounds. These excited movements are particularly odd on account of the extreme grotesqueness of the performer. The curious downward curving horns, the upright mane, the long hair on its face form a comical set of features worthy of such a droll comedian.

The white-tailed gnu is nearly extinct: it was very common in South Africa in the early part of the nineteenth century. The brindled species derived its name from the hair on its neck and the sides of its body being disposed in vertical bands of differently directed hairs.

The horns in the young gnus are straight spikes; as the animal becomes adult they curve downwards. It is strange that such a simple fact was not appreciated until 1889, a century after these animals were discovered by the Dutch settlers.

Wildebeests are often seen on the Athi plains. They are not so common or so widely distributed in British East Africa as hartebeests. The gnus suffered almost as badly as buffaloes and kudus from rinderpest, which

ravaged East Africa in the last decade of the nineteenth century.

Perhaps the most characteristic antelope of the grass plains of East Africa is the ugly beast known as the hartebeest.

No one can mistake this animal with its long narrow

The Wildebeest, or Gnu, in its antics.

head, intensified by the frontal bones being produced into a high crest surmounted with big acutely angulated and strongly annulated horns. The high withers and tapering croup produce an ungainly appearance enhanced by the awkward gait of the animal, for a hartebeest when galloping suggests an animated rocking-horse. Hartebeests can move very quickly; they are always

watchful, alert, and, when grazing, guarded by sentries, usually old bucks, with eyes as keen as those of a hawk. These sentinels often post themselves on an anthill in such excellent positions as to command the plain for a mile or more. Hunters dislike this animal, for it seems to be the self-appointed watchman of the grazing ground,

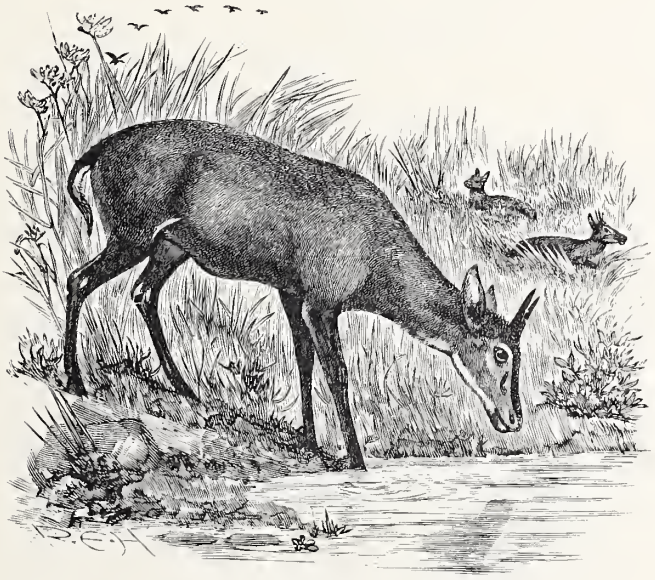
The Head of an Adult Brindled Gnu (*Connochætes taurinus*) and its Calf, showing the horns growing out as spikes; they subsequently assume the peculiar curves characteristic of the adult. (Natural History Museum.)

and its cry of warning will send various kinds of beasts, especially zebras, galloping over the plain. The hartebeest obtained its name from the early Dutch settlers in South Africa because it is so hardy, and so tolerant of severe injury. Hartebeest are common throughout the African Continent and they vary in form, colour and shape of the horns, according to age and sex. In

The Hartebeest, Kongoni of the Swahilis. This animal can move quickly, is always watchful and alert. When grazing the herd is guarded by sentries, usually old bucks. A sentinel is often posted on an anthill in such a position as to command the plain.

zoological collections, alive or stuffed, no two specimens are alike.

Topi is the Somali name of an antelope intermediate in size and ugliness between the wildebeest and the hartebeest; it lives in the Mau Highlands. The skin of the topi presents glossy purple reflections like the bloom on a ripe plum. The curious curve of its horns both in male and female is a most striking specific feature.



A duiker.

The topi does not occur in large herds like the kongoni, but twenty or thirty may herd together.

Duikers or duikerboks are small animals (they weigh about thirty pounds), and with one exception (the Indian four-horned antelope) live in Africa, where they are widely distributed, and exhibit endless variation. Duikers, male and female, possess a pair of small straight horns. Some of the species have a tuft of hair between the horns, almost hiding them, and from this "head-crest" the name of the genus, *Cephalophus*, is derived:

all the species have well-marked faec-glands. The name duiker or diver is derived from the habit these antelopes have of diving quickly in and out of grass or bushes when alarmed. Duikers are found throughout British East Africa and Uganda, and their horns and skulls adorn the walls of settlers' houses. In Uganda there is a species, scarcely larger than a rabbit, called the blue duiker; its skin is a regular article of exchange in the market at Mengo. The Baganda make rugs of the skins by sewing them neatly together.

Zoologists find it difficult to frame definitions for distinguishing antelopes from sheep, oxen, and goats. The difficulty in this matter of classification is betrayed in their names. Even the familiar word gazelle comes from the Arabic *ghazal*, a wild goat. Then the high-sounding classical names derived from Greek and Latin authors, as applied to these animals, bring out the difficulty of deciding between antelope and buffalo in the case of the gnu and hartebeest, for they are grouped as bubaline antelopes (*bubalus*, a buffalo). The big ox-like antelope, the eland, is taurotragus. The elegant roan antelope (*Hippotragus equinus*) has many equine characters but molar teeth like those of oxen. The genus to which the reedbucks belong has a name, *Cervicapra*, which suggests that the species comprised in it have characters which are cervine and hircine as well as antilopine. In spite of all these facts an antelope is not a goat. The early Dutch colonists called the antelope *bok* (pronounced *buck*) which means a goat. In this way arose such compounds as springbok, steinbok, duikerbok, etc.

A study of the generic and specific names imposed on antelopes by zoologists shows a strange mixture of classical names like oryx and strepsiceros, harnessed to native names like *kudu*, *jimela*, and *gnu;* or names expressing affinity, such as *cervicapra;* physical characters like *imberbis* (beardless); lucky sportsmen and

explorers, Grant, Speke, or Coke ; or scientific zoologists, Lichtenstein and Gunther.

Among the foes of the antelope mention must be made of the wild dog (*Lycaon pictus*). This animal is something like a hyæna, and is often mistaken for a small hyæna. The wild dogs hunt in packs, which usually number fifteen ; they may be as many as fifty

The Wild Dog, the terror of antelopes ; it hunts in packs.

and as few as four. One dog may hunt on its own account, and Selous has given an account of the persistent and determined manner in which these vicious animals pursue their prey. He was an eye-witness of a wild dog pursuing a sable antelope. The dog ran by the side of the running animal, and, springing up from time to time, would bite the antelope in the flank.

When hyænas or dogs attack wildebeests they try to break up the herd, then they follow and hunt down a single animal. The dogs have little chance when the herd keep together.

Major Powell-Cotton, when in the neighbourhood of Lake Baringo, saw two animals which he regarded at first as hyænas, but close scrutiny taught him that they were wild dogs, and he saw the rest of the pack trying to cut off a zebra, but the herd bunched together and drove them off. He shot one of the dogs, and the rest of the pack worried it and then made for the Major, who succeeded eventually in shooting six out of a pack of fifteen.

Although wild dogs are common they are seldom seen in daylight. They hunt in packs all over East Africa. The pups are pretty and fascinating little creatures.

XXV

PESTS : JIGGERS, TICKS, AND MOSQUITOES.

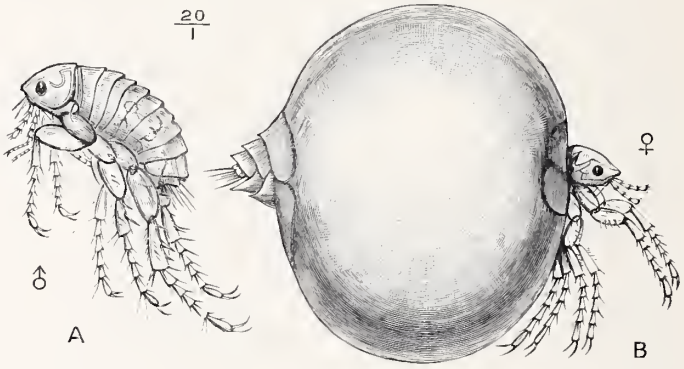
In Uganda there are four inseets so abundant and so troublesome to man that they are very properly plaeed in the eategory of pests. These four inseets are the sand flea, the tiek, the mosquito, and the tsetse fly.

The Sand Flea, also known as Chigger or Jigger, eorruptions of Chigoe, its West Indian name, formerly confined to the tropical parts of America and the West Indies, was carried to the west eoast of Afriea by trading-vessels and appeared in that eountry about 1872 ; the parasite subsequently spread over the greater part of the continent.

In Uganda jiggers are ubiquitous ; Dr. Albert R. Cook, of the Medieal Mission, Mengo, states that they appeared in Uganda in 1891, having apparently been earried aeross Afriea by Stanley's last expedition. Stanley's men on that oeeasion did not aetually enter Uganda, but many Baganda who had been driven out of their eountry by a revolution met with Stanley's expedition and brought jiggers to Uganda. Following the earavan route they slowly made their way down to the eoast, whieh they reached in 1899. Till the natives realised the nature of this disease, jiggers eaused great damage, and the loss of many toes.

This flea inhabits the dust of native huts : it is somewhat smaller than the ordinary flea and possesses

the disagreeable habit of readily attacking any warm-blooded animal. The natives walk about with bare feet; therefore these parts suffer; but the flea may penetrate the skin on any part of the body, even the hands and face. It is the impregnated female which causes the trouble, by burrowing obliquely into the skin of the sole, or that lining the clefts between the toes, or at the roots of the nails, until only the posterior segment is visible: the flea remains in



The Sand Flea, or Jigger (*Dermatophilus penetrans*). A. The male. B. The impregnated female.

the skin whilst the eggs mature. The presence of the jigger causes irritation and pain: on examining the feet a small dark spot in the centre of a small swelling or blister will be seen. Usually only one or two jiggers exist in the skin, but a score or more, even a hundred, may be present. The native boys, with a pin or a needle, carefully remove the insects intact if possible, and are very skilful and neat in extracting them. It is necessary to be careful to clean the wound left after the removal of the jigger with an antiseptic solution, for some of these small holes have been the starting-point of serious and sometimes fatal erysipelas, septic infection, and tetanus. Europeans living in Africa are often troubled with

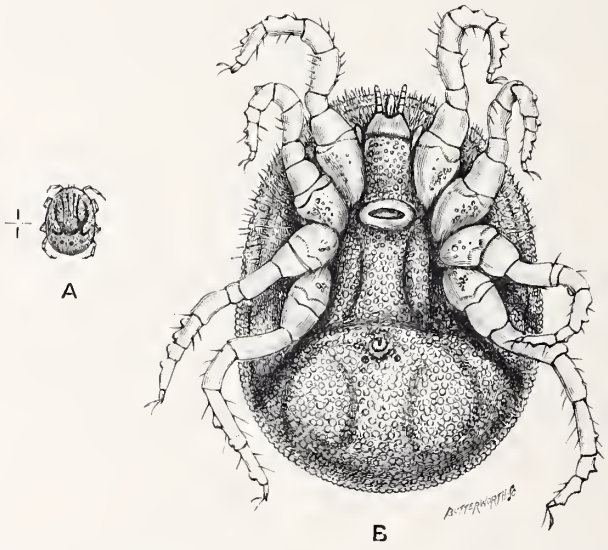
these pests because the native boys employed as domestic servants often have jiggers in their feet. When the eggs in the flea mature they are expelled and fall to the ground; as these boys run about with bare feet the dust on the floor of the house soon swarms with fleas; if the white people living in the house walk about their rooms with bare feet they very quickly get infected, especially babies. The floors of rooms should also be kept as free as possible from dust, as this harbours the fleas.

The life-history of the sand flea is briefly this:—The unimpregnated female jigger, like the male, is free: when impregnated she avails herself of a warm-blooded animal, burrows into the skin, and proceeds to grow eggs. As the eggs ripen the flea attains the size of a small pea. When the eggs (ova) are mature they are expelled and fall on the ground and a larva hatches out of each: this larva spins a cocoon for itself and emerges as a perfect sand flea in eight or ten days. When the jigger is retained in the skin until the eggs are laid, the skin ulcerates and the flea is expelled. This leaves an uncomfortable ulcer.

Ticks belong to the same group of Arachnids as mites. The ticks are blood-sucking parasites which attack animals, wild and domesticated, and man: they are nearly always acquired from vegetables, grass, and herbage.

The life-history of a tick is briefly this:—A female tick attaches herself to an animal for a time, and then drops off and lays eggs, which are small, yellow grains, like roe, in the soil; as many as ten or even twenty thousand may be laid by one tick. The eggs take from three to five weeks to hatch and the larvæ climb neighbouring plants and grass and fasten on passing animals. They remain on the animal for a few days and after distending themselves with blood drop off, seek a place of concealment, and become torpid. At the end of eleven weeks the nymph emerges, fastens on

an animal for six days, then after passing again through a period of concealment and torpidity for eleven weeks, moults, and emerges as a mature tick. When attached to an animal the female tick seeks a male tick, and after pairing she remains on the animal till thoroughly distended with blood, then drops off, descends to the



The Tick (*Ornithodoros moubata*). A. Natural size. B. Highly magnified.

earth, and lays eggs. At least a year is occupied by the whole cycle. The male remains on the animal for months after the female has fallen off.

Adult ticks are visible to the naked eye, and the females are usually bigger than the males. In some species the female tick, when full of eggs or distended with blood, may measure two centimetres in length.

The species known as *Ornithodoros moubata* is widely distributed through East Africa. Its body is flattened and oval in outline. The integument is hard and leathery. The female of this species is about 8 mm.

in length and 6 mm. in breadth. It resembles the common bed-bug and lives in huts, retiring into cracks in walls or floors or in the grass-covered roof during the day and becomes active at night; then, if the opportunity offers, it attacks man and beast.

This species is common along lines of travel and usually abounds in rest-houses; it is apt to get into bedding or sleeping mats which remain for the night in rest-houses. Old camping-grounds should always be avoided.

Ticks suffer from the uncertainty of finding a suitable host, but this is counterbalanced by their extraordinary powers of fasting, for they can remain several months without food.

In recent years ticks have acquired some importance; it has been proved by a series of most careful and brilliant researches that these parasites are capable of conveying a serious disease to cattle and to man. In order to appreciate the manner in which these diseases are inoculated into animals, it is necessary to be familiar with the main features in the life-history of ticks set forth in the preceding paragraphs.

It is an important feature in tick disease that young ticks hatched in the laboratory can communicate the disease. This means that the parasite can pass from the mother-tick to the egg. This fact was discovered by Smith and Kilborne in their investigation of Red-water, or Texas fever of cattle.

Tick fever is defined as a specific disease caused by the presence in the blood of a minute parasite or hæmatozoon, known as a spirochæta, which is introduced by the bite of a tick known as *Ornithodoros moubata*. The disease can also be conveyed by infected blood.

Tick fever was described by Dr. Livingstone, from observations made in the basin of the Zambesi, but it has been met with in the Congo Free State, Central Africa, German East Africa, and in Uganda. It was

always attributed to the bite of a tick which infested old camping-grounds along the caravan routes. No positive proof was forthcoming that the fever attributed to the bites of ticks was really caused by them until P. H. Ross and A. D Milne, working in Uganda, demonstrated the presence of a spirochæta in the blood of patients who attributed their illness to the bite of a tick.

It appears that a tick which has fed on a person suffering from tick fever may convey the parasite to healthy persons by biting them. Also the larva hatched from the eggs laid by an infected tick can convey the disease, as well as transmit it to the second generation, and the nymphs are infective to mice and monkeys.

Tick fever appears to run a different course in natives and in Europeans. In the native, the chief symptoms are fever, headache, pains in the trunk and limbs, and vomiting. There may be diarrhœa and cough. The temperature remains high for two days, then falls by a crisis, and, as a rule, the patient recovers, relapses being unusual.

In Europeans the disease begins in much the same way, but the symptoms are more severe and last longer. After the crisis the patient appears apparently well; he will get a relapse after a few days, or even three weeks, and still be liable to a series of relapses, usually five or six, but sometimes as many as a dozen. The main features of the recurrent attacks are those of the primary onset of the disease, fever, pain, and vomiting: these relapses may occur in temperate climates long after the patient has left the country where he was infected. The disease is rarely fatal in man.

There are two important diseases which affect domesticated animals in East Africa due to the bites of ticks: namely Red-water and East Coast Fever.

Red-water is a disease which affects cattle and is named after its most conspicuous sign, red urine, the

colour being due to the presence of the colouring matter of the blood. The presence of hæmoglobin in the urine comes about in this way. When cattle are bitten by the blue tick this arachnid may infect it with the disease-producing parasite known as a piroplasm: these micro-parasites multiply rapidly, invade, and destroy the red corpuscles of the blood. As a result, the red colouring matter (hæmoglobin) is excreted with the urine. The remains of the disintegrated corpuscles are retained by the spleen or by the liver, and the disturbance this causes in the latter organ leads to jaundice, which is a clinical feature often present in the late stages of this disease.

Red-water is a disease widely spread in North and South America, India, China, Queensland, Great Britain, and all over Africa. In South Africa it has been known since 1870; it was imported with oxen from Madagascar (Theiler). Treatment is useless in dealing with the disease, which can only be eradicated by destroying the ticks which transmit it.

East Coast Fever is a formidable disease, and has caused the deaths of many thousand head of cattle in East Africa: it is due to the entrance of a minute parasite into the red corpuscles of the blood subsequent to infection from the bite of a tick, but the parasites do not lead to the destruction of the corpuscle. In this disease peculiar bodies are found in the lymph glands and spleen, known as Koch's granules, which are regarded as characteristic of East Coast Fever. The transmitter of this disease is a brown tick belonging to the group Rhipicephalidæ: this tick is widely distributed in South and East Africa.

The difficulty of eradicating this disease may be appreciated when we realise "that one infected tick is capable of transmitting it."

Mosquitoes are blood-sucking insects, and a constant source of annoyance to human beings, for their bites are irritating and in some instances dangerous to health and

life. Mosquitoes abound in all climates: they swarm in tropical and subtropical countries; and are found in Arctic regions.

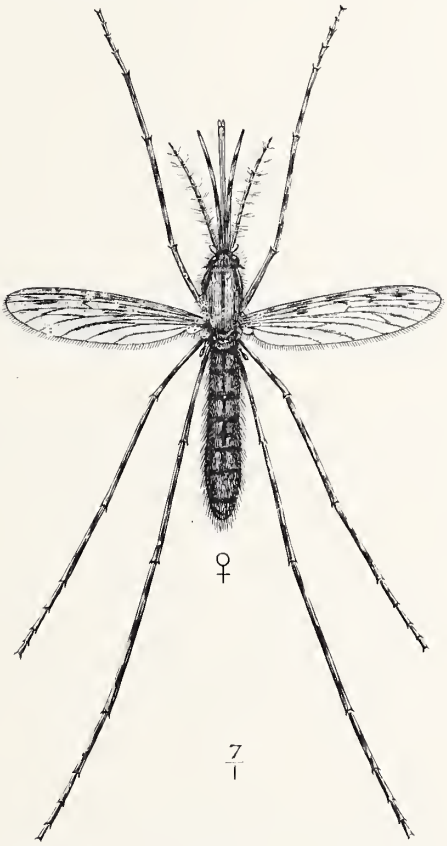
The life-history of the Mosquito is briefly this:— The eggs are laid by the female in water, on damp mud, or on leaves. The incubation period occupies a few days, and the larva emerges and lives in the water. Any collection of water is useful for this purpose, such as lakes, ponds, rivers, pools or puddles, cisterns, rain-water tanks, calabashes, flower-stands, or gallipots, the fluid in the pitchers of the Nepenthes plant, and in the deep concavities of the leaves of the pine-apple.

The larvæ, popularly known as wrigglers, live a short time and then pass into the pupa stage; the pupæ constantly come to the surface of the water to breathe. The duration of the pupal life varies from two to twelve days. When the pupæ are ready to hatch they rise to the surface of the water and as they straighten out the pupa-case splits over the thorax. The mosquito then uses the case as a raft whilst its wings dry and then flies away. The majority of mosquitoes hatch out in the early morning or at midday.

The adult mosquito prefers night for feeding: during the day it hides away in shrubs, bushes, and in the corners of huts, tents, and houses. For food, certain species take vertebrate blood; this they obtain by means of an efficient organ known as the proboscis. The females alone have the blood-sucking habit, the males feeding on plants.

Mosquitoes have always been regarded as pests in all warm countries. In districts where they abound the inhabitants have been accustomed to exclude them from the dwelling apartments, and especially from the sleeping-rooms, by means of mosquito curtains made of a thin material which cannot exclude air and light, yet is sufficiently strong to prevent the ingress of these troublesome insects. These measures were taken, not because the mosquitoes were known to be winged-vehicles of

disease, but because their buzzing is annoying, while the punctures they inflict in the skin are painful and often very irritating.



The Mosquito (*Anopheles maculipennis*). The conveyor of the parasite of malaria.

Although malaria has been known for centuries, and accurate accounts of it are to be found in the works of Hippocrates, Galen, and Celsus, its cause was not detected until Laveran in 1880 discovered in the blood of patients suffering from malaria a protozoon, since named *Plasmodium malariæ*. Blood parasites of this

kind are known as hæmosporidia, and undergo an alternation of generations corresponding with a change of host. They are parasitic during the non-sexual cycle in the blood of a vertebrate, and the sexual cycle is passed in the gut of an invertebrate host. This change of host has been found to be effected in the case of the malaria parasite by a particular species of mosquito known as anopheles. That some species of culex was the transmitting agent had been suspected by several observers, especially by Laveran; Ross, acting on these suggestions, demonstrated that the malarial parasite in the case of birds was transmitted by mosquitoes, and his observations were soon amply confirmed by the Italian workers Grassi, Bignami, and Bastianelli, in the case of man.

It is now accepted as a fact that the infectious agent of malaria is introduced into the human organism by the bite of an anopheles, which has itself been infected by biting individuals whose blood contained the malarial parasites.

A very convincing series of experiments were carried out, at the instigation of Manson, in which the investigators were the subjects. Drs. Sambon, Low, Mr. Terzi, their servants and visitors, lived for the three most malarial months of 1900 at Ostia, one of the most malarial localities of the Roman Campagna. They dwelt in huts, from which mosquitoes were excluded by a simple arrangement of wire gauze on the doors and windows. They lived an ordinary out-of-door life, took no quinine, but were especially careful to retire to their wire hut from sunset to sunrise. Although their neighbours the Italian peasants were each and all attacked by malaria, the dwellers in the mosquito-proof huts enjoyed absolute immunity.

The converse of this experiment was also carried out. Mosquitoes fed in Rome on persons suffering from malaria were sent to London and were allowed to bite two healthy men, Dr. P. Thurburn Manson and

Mr. George Warren, who in consequence developed malarial fever, and the *Plasmodium malariæ* was found in abundance in their blood.

It is now an accepted fact that the malaria parasite, under natural conditions, can be acquired by man through the bite of a mosquito. It is also recognised that the mosquito acquires the parasite by ingesting the blood of a man or a mammal infected with malaria.

It is clear in these circumstances that in order to eradicate malarial diseases it is only necessary to destroy the species of mosquitoes which act as transmitters. This of course is a difficult task, but wherever efficient steps are taken to prevent the breeding of mosquitoes by filling up pools, draining marshes, and emptying the stagnant water from cisterns, tanks, gutters, and the like, near villages and dwelling-houses, in districts where malaria is endemic, the number of infected patients steadily diminishes.

The surest, safest, and simplest of all measures is to avoid being bitten by infected mosquitoes : as these are nocturnal insects and easily excluded by the use of thin wire-gauze or the well-known mosquito curtains for windows, doors, and openings of living and especially sleeping apartments, the task is neither severe nor irksome.

References.

Cook, A. R. ... ... "Notes on the Diseases met with in Uganda," *Journal of Tropical Medicine*, 1901, p 175.

Manson, Sir Patrick ... *Tropical Diseases*, Fourth Edition, 1909.

Sambon, L. W. ... ... "Ticks and Tick Fevers," *Journal of Tropical Medicine*, 1900, p. 217.

XXVI

FLIES AND SLEEPING SICKNESS

Modern medical writers recognise the part played by flies in the dissemination of disease; they multiply upon organic refuse of every kind, and if the temperature be favourable for their development, refuse and dead animal bodies abundant, flies may become a plague. They lay their eggs in carcases at the very instant of death and the species of flies and beetles which infest dead bodies are so numerous that the phrase "Fauna of Corpses" is justified. Linnæus is credited with the statement that three meat-flies by reason of their rapid multiplication would consume a dead horse quicker than a lion. Moses turned his Egyptian experience to good account, for he recognised the value of the prompt burial of organic refuse, and gave explicit instructions for the burial of excrement (Deut. xxiii. 12, 13).

Apart from the irritation and annoyance caused by flies (and to this day Egypt is plagued with them), there are very serious diseases afflicting man and animals in which flies play a very active part. The one with which we are specially concerned is known as sleeping-sickness.

The consideration of the stages by which knowledge has been gained concerning the part played by Tsetse flies in spreading this, at one time, mysterious disease is brimful of interest, and leads us to admire the energy of the skilful investigators who have devoted them-

selves to this work. That the subject was one demanding the best efforts of the Imperial Government for effecting its elucidation is shown by the statistics recently furnished by Sir David Bruce. The toll of human lives exacted by this disease in Uganda is estimated at 200,000 out of a population of 300,000. The island of Buvuma in the Victoria Nyanza had a population 22,000 : of these 18,000 are reported to have perished from sleeping-sickness (see also p. 52).

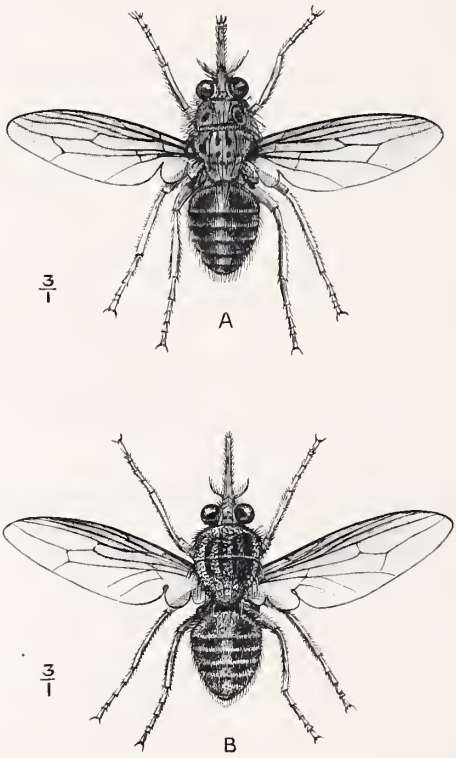
Tsetse flies are confined to the African continent and occur in its tropical and sub-tropical zones. Tse-tse is the native name for these flies in imitation of the buzzing sound they produce when flying : they have no uniform distribution but occur in "belts" of forest, bush, or banana plantations on the margins of water-courses, rivers, and lakes. A tsetse fly is not dissimilar in shape and size to a blow-fly, but is furnished with a prominent proboscis. It is easily distinguished from other blood-sucking flies by the position of its wings when at rest, for they close over each other like the blades of scissors. The wings also possess a characteristic venation. The most striking peculiarity in the wing is the course of the fourth longitudinal vein which, about the middle of the wing, bends abruptly upwards to meet the short and very oblique anterior transverse vein ; here describing a right angle it runs obliquely downwards to meet the posterior transverse vein, and then turns upwards to meet the margin of the wing near the apex.

The food of the tsetse fly is the circulating blood of a vertebrate animal. This fly does not lay eggs, but the female produces a single full grown larva, which crawls away into some hiding place and turns into a pupa ; after a variable period, about six weeks, the perfect insect emerges from the pupa case.

Tsetse flies cause trouble to all explorers and hunters who attempt to penetrate the recesses of the tropical parts of the African continent. The disasters biting

flies cause by destroying horses is set forth in many interesting books written by missionaries, explorers, sportsmen, and hunters.

It is not too much to state that in the early days of the exploration of the Dark Continent tracts of



Tsetse Flies.
A (*Glossina palpalis*) bites and infects men.
B (*Glossina morsitans*) bites and infects horses.

country known to harbour this pest (fly-belts) were more securely protected by it from the inroads of the explorer, than by the arrows, javelins, and spears of naked savages.

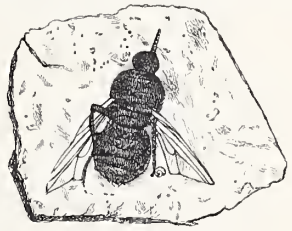
In connection with the prevalence of fly-disease or "nagana" in Africa and its deadly effects on transport

animals it may be worth mention that a fossil biting-fly has been discovered in the Miocene shales of Florissant, Colorado. This fly had a remarkably long and strong proboscis. Professor T. D. A. Cockerell recognised it as a tsetse-fly.

"The mouth parts are preserved, as also the body, wings, and legs, all agreeing so well with the modern tsetse-fly that the generic separation is impracticable."

Tacked on to the description of this fossil is the subjoined suggestion by Professor Osborn :—

The former existence of a Tsetse-fly in America is of peculiar interest as having a possible connection with the disappearance of some of the Tertiary mammalia.



A Fossil Tsetse Fly.

The thorax is a little distorted ; the small shell near the right wing is a planorbis.

The tsetse fly *Glossina palpalis* assumed great importance when it was discovered (1903) to be capable of conveying trypanosomes, the parasites which cause sleeping sickness. In the dry terms of a medical text-book this disease is defined as :—An endemic disease of different parts of Equatorial Africa, characterised by a gradually increasing lethargy, mental and physical degeneration, elevated evening temperature, rapid pulse, progressive emaciation, and tremors ; after running an acute or chronic course, it almost invariably terminates fatally.

This is a dreadful indictment against any disease, but it is more remarkable than appears from this carefully drawn up statement of claim. Although Sleeping Sickness was known to medical writers early in the nineteenth century, the disease did not really attract much attention until it was detected in Uganda in 1900 by Dr. J. Howard Cook of the Mission Hospital, Mengo. The disease spread very rapidly along the north shore of the Victoria Nyanza, especially in

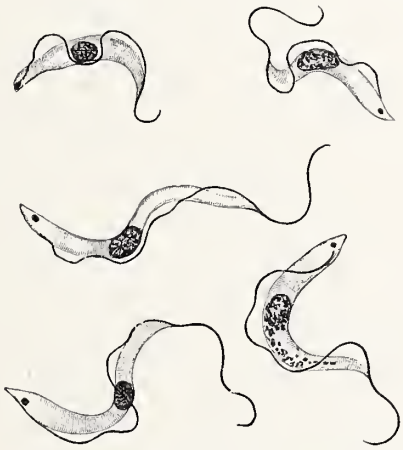
Usoga and along the east side of the lake to Kisumu. It spread to, and practically depopulated, the islands of the Sesse and the Buvuma Archipelagoes, and the lacustrine districts in the German sphere of interest. In Uganda it is very prevalent and no age is exempt. Race plays no important part, for many Europeans have contracted the disease.

For a long time Sleeping Sickness baffled all attempts to determine its cause, but in 1902 Castellani examined the cerebro-spinal fluid from patients with this disease for organisms and detected the presence of trypanosomes in this fluid. This discovery was confirmed by Sir David Bruce, and Drs. Nabarro and Greig.

The trypanosome is a protozoan parasitic in the blood of vertebrate animals. It lives freely in the serum of the blood, never within or attached to blood corpuscles, and possesses an undulating membrane which runs down one side of its more or less spindle-shaped body. At, or near, one extremity of the trypanosome is placed the blepharoplast, and from this structure, or in its immediate vicinity, the flagellum takes origin and runs along the free edge of the undulating membrane to the opposite end of the body, where it continues its course as a free flagellum.

When these parasites obtain an entrance into the bodies of men, certain mammals, and birds, they flourish, multiply, and, certainly in the case of man, disturb the health: in the majority of instances they destroy life. Infection by these parasites is termed trypanosomiasis. So far as we know the chief disease resulting from their presence in the blood of man is known as Sleeping Sickness, or Negro Lethargy. The Baganda call the disease Kubongota "to nod." The species more particularly connected with man is known as *T. gambiense*. When these parasites colonise the blood they are carried in this medium through the "natural gates and alleys of the body" so that when blood is extracted either from the trunk, the tip of the toe, finger,

or nose, and examined under the microscope, the minute wriggling parasite will be seen in the field. Careful observations also show that though the parasites swarm in the blood this is not their only, or, indeed their chief, habitat, but they occur in the lymph glands and the cerebro-spinal fluid. It was in this fluid that Castellani discovered them and laid the real foundations of our knowledge of the pathology of sleeping sickness. The chief lesions which lead to the fatal termination of trypanosomiasis and which secured for it the name



Trypanosomes (highly magnified).

sleeping sickness are associated with the membranes and superficial strata of the brain and spinal cord. For these facts we are indebted to the careful work of Mott.

Having discovered that sleeping sickness was caused by trypanosomes, the next and most obvious step was to find out how the parasites obtained access to the bodies of men and women. It has already been mentioned that the early exploration of the interior of Africa was seriously hampered by the fact that transport animals acquired a disease due to the bite of a fly which was particularly fatal to horses, donkeys, and dogs. Bruce

carefully investigated animals bitten by the tsetse fly known as *Glossina morsitans* and succeeded in proving that the fly-disease (Nagana) in horses, cattle, and dogs was due to the presence in the blood of a trypanosome, and that this fly could convey the disease from an infected to a susceptible animal.

As soon as the nature of sleeping sickness was appreciated, its analogy to nagana led the investigators to suspect a biting insect as the conveyer of the parasite. Steps were taken to ascertain the distribution of the sleeping sickness, in order to determine if it coincided with that of any known biting insect, for the tsetse fly was at once suspected. The results of this investigation were very conclusive, for these flies swarm on the shores and islands of the Victoria Nyanza, and especially in places where the half-naked natives meet in thousands to trade in fish, bananas, etc.

Experiments were then conducted with tsetse flies. The insects, enclosed in cages, were allowed to feed on natives suffering from sleeping sickness. Those flies which had fed were then confined in cages and allowed to bite monkeys, and the bitten monkeys acquired sleeping sickness in consequence. It has been estimated from careful observation that among wild tsetse flies, 1 in 400 is infective. (Bruce.)

The large amount of careful experimental work has satisfactorily settled the question that the parasites, which cause sleeping sickness in man, can be conveyed from patients affected with trypanosomiasis to susceptbut previously healthy men, women, and children, black or white. The black people are more easily infected than the white, for the latter wear clothes. In the districts where this disease exists it is no uncommon thing to see partially clothed natives sitting in the sun and their bronze-like bodies dotted with flies.

From a prophylactic point of veiw it becomes important to determine not only from which animals other than man *G. palpalis* obtains its trypanosomes,

but also if the trypanosome undergoes any metamorphosis after it has been acquired by the fly. This has involved a large amount of investigation, and much more work is required before these questions can be satisfactorily answered, but we now know that the tsetse fly is something more than a mere transmitter of trypanosomes.

In the latest reports of the Sleeping Sickness Commission sent out in 1908, it is stated the trypanosome *T. gambiense* does multiply in the gut of the fly. The flies become infective on an average thirty-four days after their first feed on infective blood, and it was proved that a fly may remain infective for seventy-five days.

These conclusions are very important, because, with the idea of preventing the spread of the disease, the natives were removed from the islands in the Victoria Nyanza and isolated from the flies. Two years after these evictions the flies along the shores of the depopulated islands were examined and found to be infective. Experiments were made to find out if the birds and large mammals, such as the hippopotamuses on the lake shore, were capable of giving sleeping sickness to man by means of the fly, but the results were negative.

It is an important feature in sleeping sickness that the disease can be experimentally produced in other animals than man. Rats are susceptible. This enables experiments to be performed to test the value of drugs. In the treatment of the disease Thomas discovered that a remedy known as atoxyl caused the disappearance of the parasites, but further observations showed that after a time they reappeared in the blood. The experimenters then realised the astonishing fact that the new swarm was not affected by the drug, they had become atoxyl-proof. Plimmer has proved that the hypodermic use of sodium tartrate of antimony will cause a very rapid disappearance of the trypanosomes from the

blood. It is an unpleasant remedy, but at the present time it is the only reliable drug available against this deadly disease.

The medical profession has long realised that the use of drugs in many diseases is really drawing a bow at a venture. Certainly so far as contagious diseases are concerned prevention is better than cure. To avoid bites from the tsetse fly becomes an injunction fairly easily obeyed in the case of Europeans who wear clothes, and especially if they will remember that *Glossina palpalis* can bite through thin coverings, especially the stockings of ladies. The case of the naked natives is different, for they are ignorant and indifferent. The fishermen on the shores of the Victoria Nyanza allow the flies to rest on their skin in dozens, and they take no trouble to disturb them. When the matter is explained to these folk, they reply that the flies had always been on the lake shore in their time and during the life-time of their fathers, and were harmless. A cheap and effective method of suppressing and exterminating the fly is needed. Vigorous steps in this direction are being taken. The Uganda shores of the lake have been cleared of natives; the narrow strips of land where tsetse flies abound have been cleared of jungle and rushes, especially near landing-stages, ferries, roads, and wells, with encouraging results. The old motto which runs:—"Oppose a distemper at its first approach," must be replaced by one probably as ancient—"Prevention is better than cure."

Tsetse Fly (natural size).

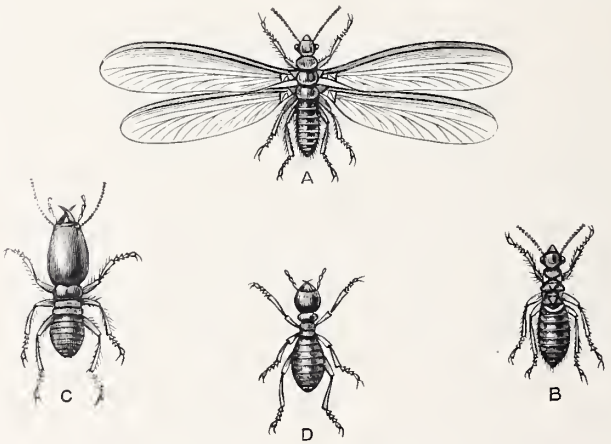
XXVII

TERMITES (WHITE ANTS)

EVERY Englishman who visits Tropical Africa for the first time has his attention arrested by the large mounds formed by the termites. These large and curious structures are almost as constant features in an African landscape as cottages in the rural parts of the British Isles. Termites are often called white ants, but Smeathman, who wrote an interesting account of their natural history in 1781, distinctly mentions that although these insects live in communities, construct extraordinary nests, and are, like ants, omnivorous, they are by no means the same kind of insects. There are scarcely any two divisions of insects more different than termites and ants.

Termites live in communities consisting of enormous numbers of individuals; among them there are several forms, such as workers, soldiers, and winged males and females. The winged individuals are only present in the nest for a few days and then leave in swarms. In addition, there are the king and queen, which also lack wings, and therefore cannot leave the nest; the queen is enclosed in a cell. The continuance of the community depends entirely on the king and queen; and if the queen dies the community perishes. The queen has a remarkable appearance, for the abdomen, in consequence of the formation of the eggs within it, grows enormously, and these are discharged in such large quantities that

Smeathman frequently observed old queens which protruded sixty in a minute. As there is reason to believe that a queen lives several years, the amount of eggs she produces is prodigious. The eggs, as soon as laid, are removed by the attendant workers to the nurseries, fed and watched until they are capable of taking care



Termites (White Ants).

A, Winged form; near the base of each wing there is a line of weakness along which the wings break off, leaving the stumps as short horny flaps; B, female; C, soldier; D, worker.

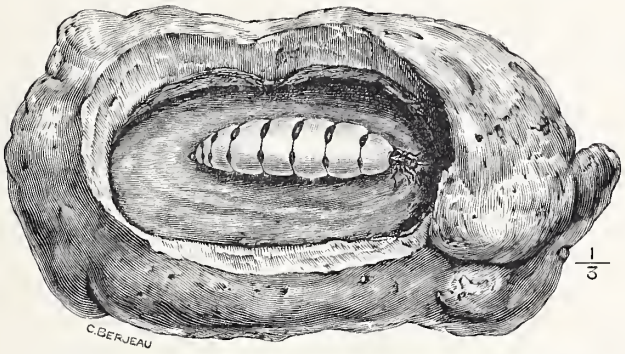
of themselves, and develop into workers, soldiers, and winged individuals.

The life-history of termites has not been followed in great detail for several reasons: they live in communities concealed from observation; isolated individuals do not thrive; and their growth is unusually slow as compared with other insects.

A study of the nests (termitaria) is interesting. The material used for their construction is either earth, wood, or the excrement of the termites, and the large edifices constructed by them are so solid that they look like stone and are so hard that it requires a pickaxe or a

crowbar to demolish them. The material out of which they are constructed is in some cases wood that has passed one or more times through the alimentary canal of the termites, and the material is cemented together by a secretion furnished by glands. Smeathman described the nest of *Termes bellicosus* as consisting of clay-like material cemented by their secretions to a very firm consistence.

In some parts these nests or termitaria are so numerous that they appear clustered together like huts in a



The Queen in the Royal Cell. The abdomen, in consequence of the formation of eggs within it, grows enormously. The number of eggs she produces is prodigious.

native village. They may be ten, twelve, and even eighteen feet high. Within these firm shelters the termites are protected from the vicissitudes of the weather and attacks from natural enemies.

The outer shell of the nest is not only useful to protect the community, but it preserves a regular degree of warmth which is very necessary for the development of the eggs and the growth of the young. The queen's cell is situated in the middle of the nest, and the entrances to it will not admit anything larger than the soldiers and workers. The royal cell is surrounded by a great number of chambers of various shapes and sizes, all of which intercommunicate and form an

intricate labyrinth; some of them contain food, such as raspings of wood and gum. These chambers are by no means confined to the part of the termitarium above ground, but extend into the earth below, and to parts far beyond that occupied by its base.

It is a remarkable feature of termites that the workers and soldiers never expose themselves to light; they either travel underground or within trees and substances they can destroy. When in search of plunder above ground, their pathways are really covered-ways, for they build tunnels of the same material of which the nest is constructed. Whenever the termites make a covered-way it has many ramifications, and if one of the covered-ways be destroyed by violence there are many avenues of escape without coming into the light. The galleries are large enough to allow them to pass each other. These insects are much disturbed when their covered-ways are broken, and they quickly repair them, because when termites appear above ground they are seized and destroyed by ants.

Some species of termites build nests in the tops of trees, but the passages leading to the nest run up the trunk of the tree under cover, so that the nest in the tree-top is in connection with a nest of galleries in the earth beneath.

On one occasion I saw a grove of trees with all the trunks covered with vertical lines of clay: of this curious appearance I find the explanation in Smeathman's paper:—If a piece of dead wood is covered with sound bark, they will eat all but the bark, which remains and exhibits the appearance of a solid stick. If they cannot trust the bark, they will cover the whole stick with their mortar and eat up the whole of the wood. Thus, when a large tree has fallen from age or violence, the termites will eat the woody part away, and a traveller finding a large tree trunk in his path steps upon it, when to his surprise it gives way and he falls among the neighbouring bushes. In this way

termites play a useful part in tropical forests, as they keep it clear of dead trees and branches. As soon as the sap ceases to flow through a tree the termites attack and quickly reduce it to powder. All would be well if these active insects confined their attention to dead or dying trees in a forest, but they eat leather as well as wood, and in countries where these destructive pests abound, the traveller must look to his impedimenta, for they eat the wooden store boxes, leather cases, saddles, boots and similar things in a very short time. The only things which will resist the termite are those made of metal or teak.

There are many stories in vogue of houses and stores tumbling down on account of termites destroying the supporting beams. Many years ago a British man-of-war on the Chinese Station had the fittings of her barbettes mounted on thick wooden bases. In due course the day of gun practice arrived, and on attempting to work the guns it was found that the barbettes had sunk twelve inches. Inspection of the foundations of the barbettes revealed the fact that they had been eaten by termites. The destruction they cause in European communities in tropical countries is as great as that produced by rats in England.

A. J. Hayes found termites especially numerous around Gallabat, on the Blue Nile, and mentions that these insects are not numerous at a distance from water, and cannot work without moisture to renew the fluid that exudes from their mandibles, and which enters into the composition of the material of which they build their dwellings. The ant hills from nine to twelve feet in height were usually built close to a soft-wooded tree; the roots of this tree had been attacked by the termites and converted into earth. The tree is the victim of a gale of wind, and lying on the ground it is soon converted into red compost by these indefatigable workers. In the dry months they

convert straw and wood into this red material. Hayes is strongly of opinion that much of the mud carried down by the Nile is due to the activity of termites in the western borderland of Abyssinia.

Drummond, in an interesting essay on termites, gives an account of the ravages committed by these insects on the trees of the great plateau between Lakes Nyasa and Tanganyika; he also draws attention to the enormous amount of earth which is removed by the termites from the deeper layers of the soil and brought to the surface for the construction of their nests and for covering the bark of trees. During the dry season this work goes on incessantly, and much of it becomes distributed by the wind as dust, and serves as a top-dressing to the vegetation around. In the rainy season, which lasts intermittently for weeks, the loose soil is washed away in quantities, and some of the termitaria, though they have great resisting powers, are not invulnerable, and ultimately succumb to denuding agents such as mud and rain.

This is an interesting theory and worth consideration, especially when taken in conjunction with Hayes' observation, for he explained to me that the red earth which is such a conspicuous feature of the mud brought down by the Nile, ordinarily described as coming from the Abyssinian Highlands, is not to be seen apart from the districts in which termites abound.

Termites are blind, but when disturbed they express their alarm by hissing; it is well established that they have means of communication by sound. The exact mode in which the sound is produced remains unknown. Although termites are blind they can inflict sharp bites with their mandibles.

In the winged state the termites are much altered in shape and form. They have a pair of eyes, and four wings, but these differ from the wings of most insects, for they are only used for a single flight, and are then shed by detachment at a suture which exists across the

narrow part of the wing near the body, leaving four short stumps. These insects usually swarm just before the rains ; emerging from the nest in myriads, they are preyed upon by birds, animals and men. After shedding their wings they fall to the ground and become

An Ant-hill of unusual shape on the Baringo Plain. (Photo by Mr. F. C Cobb. From Powell-Cotton's *Unknown Africa.*)

available for reptiles and ants. The winged termites are the sexual form, and, on the ground, the males may be seen chasing the females, and in this stage they are the easy helpless prey of the ants.

The natives look for the swarming of termites with the same interest as sportsmen look for pheasants and the London poor for fresh herrings, and they seeure them

by very simple means. A network of boughs is built around the hill and thatched with grass so that it looks like a miniature hut, and if there are many nests in the neighbourhood, an appearance resembling a small village is produced. In Uganda a covering of bark cloth is thrown over the nest (see p. 64), and when the termites issue from the holes near the base of the nest they strike the roof and tumble into the receptacle set out for them. When these insects swarm unexpectedly the natives use smoke and quickly bring them to the ground. Many of course escape, and are pursued by every winged thing in the neighbourhood. Some of the birds get so replete with these fat insects that they are unable to close their bills.

The natives often eat the termites as they catch them; but it is a more common custom to cook them or eat them when mixed with other food. European travellers have eaten termites, and Schweinfurth described them as a welcome addition to his slender larder, which helped to compensate for lack of grease. Smeathman states that he has eaten termites on several occasions and found them delicate, nourishing, and wholesome.

Termites are not as a rule found above an altitude of 4,000 feet; on the Baringo plain they are common, of a curious shape and attain a great height. In some parts of Africa the hills are shaped like mushrooms, but the majority are conical.

Drummond states that the most peculiar as well as the most ornate kind of "ant-heap" in Africa is a small variety from one to two feet in height which occurs in myriads along the shores of Lake Tanganyika. It is built in symmetrical tiers, and resembles a pile of small rounded hats, one above another, the rims depending like eaves, and sheltering the body of the hill from rain.

When a number of ant-hills are built in a wood, the appearance they produce among the trees and tall grass is that of a neglected cemetery; the termitaria resemble obelisks and grave stones. The ant-hills are sometimes

put to quaint uses, for Macdonald states that the English soldiers in Pretoria scooped out the interior of the small beehive-shaped nests and, covering the tops with clay, used them as ovens. Sir Samuel Baker converted one into a kiln in which to burn oyster shells in order to obtain a supply of lime for soap-making.

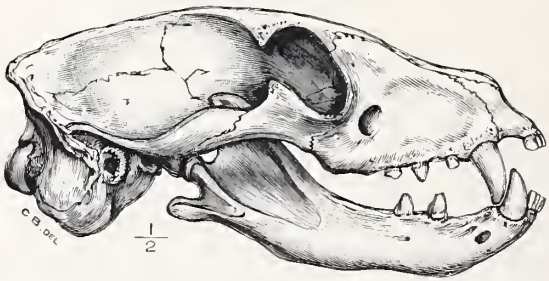
The Aard-Wolf (*Proteles cristatus*) lives in the disused holes of the antbear, where it sleeps all day and comes out at sunset. The mane is capable of being erected when the animal becomes excited.

The brick houses of the Scotch mission station on Lake Nyasa were built from material obtained from the nest of the white ant. For this purpose the earth from the nest was ground up, mixed with water, formed into a paste, and moulded into bricks. When dry it is very hard. The natives of Central Africa often build

the walls and pave the floors of their huts with termite earth.

The only sure way of destroying an ant-hill is to dig it up and find the queen or queens. If a queen be left the insects rebuild the nest.

A curious animal known as the Aard-Wolf lives on decomposing carcases and termites. In shape and colour it resembles the hyæna. During the day the Aard-Wolf sleeps in the unused holes of the antbear, and comes out at night. When excited or worried in a



Skull of the Aard-Wolf, showing the degenerate condition of the teeth; the animal lives on termites. (Museum of the Royal College of Surgeons.)

burrow it emits, like the skunk, an extremely fœtid fluid from the anal glands. The crest or mane of hair along the middle of its back is erected when the animal becomes excited. The feeble condition of the Aard-Wolf's molar teeth correspond to its mode of living, but the strong claws enable it to dig termites out of their nests.

References.

Drummond, H. ... *Tropical Africa.* London, 1888.
Hayes, A. J. ... ... *The Source of the Blue Nile.* London, 1905.
Smeathman, H. ... "Of the Termites in Africa and other Hot Countries," *Phil. Trans.*, 1785, LXXI., p. 139.

XXVIII

BEAKS

The beaks of birds are formed on the same lines as the horns of antelopes (see p. 266). There is a core, formed by prolongations of those bones known as the upper and the lower jaw, covered with a modification of skin known as horn; this outer covering, or sheath, is as insensitive as the horn-sheath of a buffalo, goat, sheep, or antelope. The base of the sheath (known as the cere) softens where it becomes continuous with the feather-covered skin on the bird's head.

The beaks of birds are used for offensive and defensive purposes: also for constructing nests, but above all things for obtaining food, and for this purpose it is often strangely modified. Long thin beaks are useful for obtaining worms from soft mud; and long, strong and sharp beaks are used by herons and darters to secure slippery creatures like fish. Beaks which are short, but strong and sharp, enable many birds to extract the kernels of nuts, or grubs from the trunks and branches of trees. By means of powerful, sharp, and hooked beaks, birds of prey are able to rend the carcases of animals; ducks, by means of flat, spatulate bills, sift mud and ooze to obtain the organisms necessary for their sustenance; with their stout beaks open-bills can break the shells of molluscs and extract the soft animal within.

The most delicate use of beaks is nest building; the neatness and beauty of many nests, especially those constructed by the weaver-birds are always a source of admiration. Some birds with apparently clumsy beaks build exquisite nests; other birds with dainty bills make ugly nests.

The Open-bill (*Anastomus lamelligerus*). It uses its nut cracker-like bill to break the shells of molluscs. A feather from the breast is sketched to show the expanded terminal part of the shaft; it is also slightly twisted on its axis.

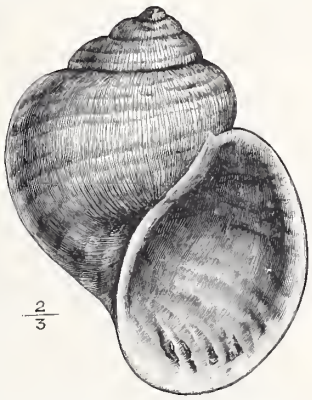
Some of the birds which live in Eastern Ethiopia possess the largest and most curious beaks known to ornithologists. Such are the Whale-headed Stork, Pelican, Saddle-billed Stork, Ibis, Marabou Stork, Open-bill, Goliath Heron, the Scissor-bill or Skimmer, and the Spoonbill.

The Open-bill, a black, long-legged, stork-like bird

which has a beak like a nut-cracker, for the mandibles cannot be closed in the middle, lives on frogs and fishes, but its favourite food consists of fresh-water molluses, especially *Ampullaria*, the shells of which it can crush with this powerful beak. On account of its cleverness in this direction it has been called the "shell-ibis."

The shafts of the feathers on the fore-neck and lower parts of the Open-bill expand in the adult bird into flat, shining, horn-like plates at the tip. This terminal expanded portion is also partly twisted on its axis.

These birds breed in society at certain localities among the reeds. The places are known to the chiefs, who, at particular times of the year, gather most of the young. The chicks are very fat, and when roasted are esteemed one of the dainties of the Barotse Valley (Livingstone).



The shell of *Ampullaria*, the favourite food of the Open-bill.

All educated men and women who visit the Nile Valley take keen interest in the Sacred Ibis. This bird was regarded with great veneration by the ancient Egyptians. Ornithologists are satisfied that *Ibis æthiopicus* is identical with the sacred ibis of the Egyptians: in the form of Toth they deified this bird, and its body was often mummified (Ibis mummies). The adult bird has a bare black head which earned for it the name of Chimney Sweeper from the Dutch in South Africa. Young birds have the head covered with short feathers, and the head becomes bald about the second or third year. The bill is long, strong, and curved downwards like that of the curlew; its chief peculiarity is a longitudinal groove on each side, leading from the nostrils at the base to near its tip.

The Ibis is generally found along the shores of lakes and rivers, hunting for shell-fish, worms, and crabs: it also frequents mud-banks, probing the mud with its long bill. In Lower Egypt the shape of the beak has won for this bird the name of "Father of a Sickle." It is common around the margins of lakes and the banks of the Nile in the Equatorial Provinces. (See p. 178.)

Hornbills are abundant in Uganda and in the Mau forests, and are sure to attract attention from the most casual observers, for they are big birds with great beaks of curious shape, fly in a clumsy manner, and make a great noise in the forest. The natives do not eat these birds and as their black and white plumage is not attractive, hornbills are common and force themselves on the attention of travellers. In spite of the size of the beak the hornbill shows great dexterity in using it, for almost every morsel of food it picks up is tossed in the air, caught, and swallowed. The neatness with which these birds can catch with the beak may be tested any day at the Zoological Gardens, and the birds often hold a grape in their beak by means of its thin stalk. In the wild state hornbills live on fruit, flowers, berries, insects, eggs, and probably many other things.

As if to atone for the heavy and apparently clumsy structure of hornbills, Nature seems to have done her best to make amends by lightening the heavy beak, for she has filled it with air-cells. It is well-known that, in birds, the air-cells of the lungs communicate with cavities in some of the bones; such bones are said to be pneumatic; in the hornbills more bones are filled with air than is common in birds; air also permeates the muscular interspaces and the subcutaneous tissues. These birds are devoid of fat beneath their skins. In many birds there is a curious gland near the root of the tail, known as the oil-gland. When birds preen themselves they are supposed to dip their beaks into this natural pomatum pot and rub it over their feathers.

In some hornbills the grease supplied by the oil-gland is bright yellow, and if the hand be rubbed over the feathers it will be stained with this pigment.

Hornbills are not only odd in appearance and structure, but they have some curious domestic habits.

Hornbills abound in Uganda and the Mau forest and are sure to attract attention, for they are big birds and possess great bills of curious shape. In spite of the apparent clumsiness of the beaks, hornbills use them dexterously, especially in catching grapes.

During incubation the hen is enclosed in a hollow tree and diligently fed by the male bird until the chicks are hatched. Livingstone noticed this breeding habit of the Red-billed Hornbill during his journey down the Zambesi. Most of the arboreal species have this habit. The material used for fastening up the hole in the tree appears to be the droppings from these birds; as the

material dries it hardens like cement. There are many facts to be ascertained in regard to the process by which the hen is immured. It is illustrated by an actual specimen of the Crowned Hornbill, in the admirable Nesting Series in the Natural History Museum, London. Dr. Schonland, who obtained the specimen, states that this bird moults before being

The Ground Hornbill (*Bucorvus*) has modified feathers, like lashes, on its eyelids, which give this bird a weird human expression, especially when screwing up its eyelids as it quizzes an onlooker.

imprisoned, and not only sheds the short feathers, but the quills of the wings and tail. This curious habit of immuring the sitting hen has been observed of hornbills in India (Tickell) and in Burma (Mason) as well as by Livingstone in Africa. The observations in regard to the African species have been confirmed by Schonland, and for the Asian species by Wallace in Sumatra. It has been suggested that the object in immuring the hen during incubation is to protect her from the attacks of monkeys and other enemies.

The Ground Hornbill (*Bucorvus*) differs from the arboreal species (*Buceros*) in several points. In size and general appearance it resembles a turkey, indeed English settlers in Africa often call it the "turkey buzzard." It has longer legs and shorter toes than the tree species; it runs along the ground and does not hop. It differs from other hornbills in having its casque open in front. Bucorvus can fly when necessary. This bird feeds on small reptiles, tortoises, insects, and everything that crawls: also roots, fruits, and berries. Like Buceros it tosses dainty bits in the air before swallowing them.

In captivity ground hornbills make delightful pets; their eyelids bear eyelashes which are really modified feathers, and when they screw up the eyelids and quiz onlookers and bystanders, the effect is very comic, and often weirdly human.

These birds are heavy on the wing and when flying produce a sound like a small steam-engine. Among trees they shuffle along the branches and resemble in awkwardness a scullery maid at a ball. Ground hornbills go about in small groups, and roost at night in trees, and, though little is known of their breeding habits, it is probable that they build in the flat crown of a tree where the trunk has decayed away, or actually in a hole (Stark).

The Whale-headed Stork or Shoe-bill, is an extraordinary bird: in 1860 two living examples were brought to England by Petherick and exhibited in the Zoological Gardens. They were obtained from the Upper Nile. It is a gaunt bluish-grey bird, four feet in height and possesses the biggest bill of any living bird: it is yellow with dusky mottlings and not unlike the head of a whale, but the Arabs liken its head and jaws to an Arabian shoe and call it the "Father of a Shoe." This bird feeds chiefly on fishes. Whale-headed storks are grotesque looking objects as they stand alone or in pairs among the rushes on the shores of broad rivers, marshes, inlets of lakes, and backwaters.

They live in the upper reaches of the White Nile, and in the creeks of the Victoria Nyanza close to the Government station at Entebbe.

This funny bird is capable of being tamed ; it thrives in the Zoological Gardens, Cairo, and strides about the palace gardens, Khartoum.

The Whale-headed Stork (*Balaniceps rex*). This gaunt bird, about four feet high, possesses the biggest bill of any living bird. It lives in the upper reaches of the White Nile, and is found among the papyrus in the creeks of the Victoria Nyanza and the Bahr-el-Ghazal.

There are four remarkable birds living around the Victoria Nyanza and the upper reaches of the White Nile with their beaks modified for fishing, each in a peculiar way, which deserve special mention. These birds are the Darter, the Pelican, the Skimmer, and the Goliath Heron.

The Darter or Snake-Bird is found on the rivers and

lakes of Eastern Ethiopia. It posts itself on a dead bough overhanging a river, or the stump of a tree, a rock, or tuft of rushes, or a rush-island. This bird swims low, exposing the head and neck, or only the beak when danger threatens: when it dives into the water hardly a ripple follows, and the feet are used as

The Darter swims under water and transfixes a fish on its bayonet-like bill by a quick thrust, then comes to the surface and the fish is jerked into the air, dexterously caught, and swallowed. The edges of the beak are furnished with fine needle-like points directed backward.

powerful paddles. The darter transfixes the fish on its bayonet-like beak with a quick thrust. On coming to the surface of the water, the fish is jerked into the air, dexterously caught, and swallowed. Having satisfied its hunger, the bird returns to a dead bough and spreads its wings "to dry." The darter rises from the water with some difficulty, and in this act its powerful

tail is of great assistance. Darters feed as the sun declines, and they are often seen in flocks. I have counted twenty roosting on one tree, which, though leafless, was white with their guano.

The skill these birds exhibit in securing fish is as amazing as their voracity. The size of the fish it is able to swallow astonished me. On the White Nile I found in the stomach of a darter three fishes, one of which was as big as a herring.

The fish-spearing habit of the darter is aided by a peculiar mechanism in its neck. The first eight cervical vertebræ, especially the eighth, are modified and produce a kink in the neck: correlated with the modification of the vertebræ are some powerful muscles which enable the bird to make sudden and powerful thrusts with its beak when it impales a fish. In order to facilitate the retention of the fish after it is transfixed, the edges of the darter's beak are furnished with fine needle-like points directed backwards.

The stomach of the darter contains, at its pyloric outlet, a singular sieve formed of hairs developed from the gastric epithelium. The lining of the stomach is sometimes shed more or less completely and a new one forms.

Cormorants, insatiable fish-eaters, abound in the Victoria Nyanza: they swarm on the shore of every island and inlet. Around the Cascades of Jinja they are present in hundreds, helping the herons to whiten with their guano the rocks and trees in the bays and recesses around the head of the Nile.

It is delightful when out on the lake in a steamer, or in a canoe, to see cormorants sitting on the small papyrus islands which float about Kaviroudo Gulf; as the steamer approaches, they either fly away or dive beneath the surface of the water. Some parts of the Suez Canal, especially the lakes, swarm with cormorants, and as the ships glide through the water these birds often crowd themselves on the light-buoys: it is not

uncommon to see ten or a dozen of them perched on one buoy.

When cormorants dive for fish they use the bill as a pair of forceps: they swim and dive with perfection, but rise from the water clumsily, and their gait on land is an awkward waddle, but they perch with ease on rocks, posts, and boughs. Their upright position when perching gives them the appearance of black bottles or other objects hung up to dry.

Herons abound around the lakes of the Rift Valley and the Victoria Nyanza. There are many species of them, including the Goliath Heron with a huge bill. This bird stands at the edge of a spit of land erect and stately; suddenly the head darts forward to seize a fish, which has come within the range of his spear-like bill. The goliath heron is a majestic bird.

The Pelican, with its huge bill and bag, is well known to all who visit the Zoological Gardens. Feeding the pelicans is one of the advertised events in most menageries, and the way they scoop up fishes resembles fishermen catching fishes with hand-nets.

Although the pelican appears such a clumsy bird on land on account of the short legs and enormous body, it can fly buoyantly and swiftly, and it is interesting to watch a flock of pelicans manœuvring in the air like a battalion of soldiers at drill.

Pelicans frequent the big lakes in Eastern Ethiopia; they haunt the shallow margins where fishes are plentiful. When the capacious bag attached to its bill is full of fishes, the bird waddles to the land and greedily swallows them.

It is somewhat difficult to understand how this uncouth bird has won such an important position in ecclesiastical heraldry. In Christian Art the pelican is a symbol of charity and an emblem of Jesus Christ. This is probably founded on the venerable legend that the "pelican in its piety" feeds her chicks with her own blood. This has no foundation in fact, and much

ingenuity has been exercised to account for the origin of the legend. None is satisfactory. It is an established fact that the pelican feeds its chicks on fishes which have been partially macerated in its own crop.

The biggest bird that flies, the Marabou, is easily recognised by its huge and powerful bill, and scabrous

The Marabou Stork (*Leptoptilus crumenifer*) has the longest bill of any living bird, and it is the biggest bird that flies. It is sometimes nearly five feet high.

head with a few small feathers scattered about it. The huge pouch hanging in front of its neck is most conspicuous when the bird feeds. These scanty feathers and the pouch have earned for this stork the name of *Leptoptilus crumenifer*. As if to make up for this deficiency about the head and neck, the bird is furnished

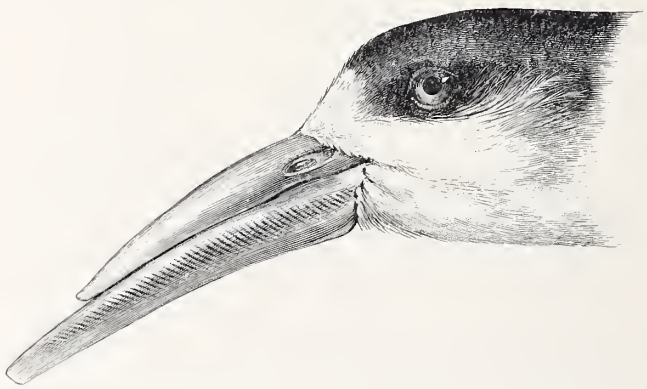
with soft lower tail coverts, worn by fashionable ladies as marabou feathers. It is odd that this, the ugliest of birds, should furnish such exquisite feathers. The curious pouch is filled with air, and opens into the nasal passage on the left side below the orbit; the bird can inflate it at will. The marabou-stork is an efficient scavenger and may be seen sailing high in the air, and descends when it descries carrion. This bird is feared by the vultures when it drops among them whilst they are gorging on a carcase. His long and powerful bill earns for him so much respect among carrion eaters that he has been termed by the natives, and not inaptly, "the master of the feast."

The marabou eats fishes, also termites when they swarm. I am not likely to forget the pleasure with which I watched at daybreak an enormous congregation of birds around a pool in the middle of a swamp, an acre in extent, near Tewfikia (White Nile). There were thirty marabous. The specific name of these birds, *crumenifer*, signifies the bearer of a purse or money bag; they are caricature-likenesses of bald-headed vergers. Among the birds were twenty-three sacred ibises, looking like acolytes, a flock of white herons which arose like a cloud when I approached too near; seven tufted umbres, many plovers, and numerous wading birds. One of the party shot a marabou, and I found in the crop seven fishes the size of large sprats. The buzzards soon came around for the spoil.

The bills of herons and cormorants are admirable forceps for securing fishes; the darter is furnished with an excellent spear for transfixing such slippery food, and the pelican possesses an excellent scoop with which to catch them wholesale. There is another bird which frequents the Central African lakes and the White Nile, known as the skimmer or scissor-bill, with the most extraordinary beak ever designed for fishing. The bill and the bird are so peculiar that they attract attention from the least observant. The bill is flattened in the

opposite direction to that of the spoonbill: it is thin and elastic like a paper-knife, and the two halves come together by their thin edges, but the lower half of the bill projects beyond the upper at least one-third of its length. During life the bill, except the terminal third of the lower half, is like the colour of a ripe orange, but it quickly fades after death to a dull yellow.

The Skimmer is like a large tern (sea-swallow): by means of powerful wings it skims the surface of the water usually as daylight fades, with its mouth wide



The head of the Skimmer or Scissor-bill. It is a tax on credulity to believe that this bill was designed for securing fish.

open, but in such a way that the lower half ploughs the water, and as shoals of small fish rise in the evening hour the bird secures a meal. Darwin gives an admirable description of the methods of this bird as he observed it on the Rio Parana and at Monte Video in 1833: "The water was quite smooth, and it formed a curious spectacle to behold a flock (of scissor-beaks) each bird leaving its narrow wake on the mirror-like surface."

The Scissor-bills are found in South and Central America and Asia as well as in the Ethiopian Region. Livingstone's attention was attracted to them on the

Zambesi in 1853: he gives an interesting account of their nesting habits. The nests are only little hollows on the sand-banks without any attempts at concealment. The young are more helpless than the stork in the fable with the flat dishes, and must have everything conveyed into their mouth by the parents.

Ornithologists have often argued among themselves whether flamingoes are long-legged ducks or duck-billed storks: this question has never been settled. No one can deny that these long-legged and long-necked birds are particularly attractive on account of their curious shape, their beautiful coloration, and the strange modification of their beaks which enables them to dabble in the mud and sift out the nutritious particles like ducks. When the duck is busy with the mud, the bill is so arranged that the lower half is lowermost; in the case of the flamingo, the terminal half of the beak is bent at such an angle that when engaged in mud-sifting, or in preening their feathers, the upper half of the beak is lowermost and the upper half of the beak fits into the lower, which is the reverse of the conditions found in birds generally. The odd shape of a flamingo's head and its apparent clumsiness on the end of a long neck reminds me of a golf-club.

The long neck and legs of the flamingo appear to some observers as awkward appendages to this bird. This is not the case. When flamingoes fly, the neck is stretched out in front and the legs behind, so that in full flight the head, neck, body, and legs form one straight line. The birds arise with difficulty from the marshes, uttering their kronk-kronk-kronk like a bronchitic fog-horn. Flamingoes appear awkward when they alight in the marsh, letting down their long legs and drawing them up again as if ashamed of possessing such things, like dainty young ladies in a drawing-room who have recently been put into long skirts and petticoats.

Many questions have been asked concerning the

The Skimmer. *Rhynchops flavirostris*, skimming.

mode in which the flamingoes sit on their nests. This is a low truncated cone of mud with a depression at the top for eggs, fashioned at the margin of a lake containing brackish water. This cone varies from two to fifteen inches in height, and the flamingo sits on it with the legs doubled under her, and the neck folded on the trunk with the head directed forward (p. 171.)

Flamingoes congregate in immense flocks, and when, as is often the case in the secluded lakes of East Africa, they stand together like a huge army, the area of the lake occupied by them seems to be covered by a pink cloud. The rosy pink of the feathers and legs of these birds is exquisite. The colouring matter permeates the skeleton and persists when the bones are macerated. When they rise on the wing, the black pinions (remiges) are exposed and then the scarlet wing coverts come well into the picture, forming a feast of colour. When a flock of flamingoes rises from the water, it leaves an impression which, like a glorious vision, is never forgotten.

XXIX

CRESTS OR TOP-KNOTS

The heads of birds are variously adorned by Nature. Some of them are ornamented with a fleshy comb, others possess wattles or gills about the gape, some have horny additions known as helmets, and many have tufts of feathers known as top-knots or crests and, in a few instances, as crowns. It is a distinction in the bird world to possess a crest. Ornithologists usually refer to this embellishment when they confer names on the happy possessors of top-knots. All animals and plants receive at the hands of zoologists and botanists two names, one generic, a noun, and the other specific, an adjective: these are chosen from the Latin language for the convenience of naturalists throughout the world.

The names of living things are not the same in all countries and often vary in different parts of the same country, but educated men throughout the world are familiar with Latin, which was formerly the universal language of science, therefore the application of generic and specific names derived from this language enables a zoologist to know the genus to which the animal belongs. The specific name often signifies some fact connected with it. Such reference in the case of a bird may convey information concerning its size, colour, length of legs, breadth of wings, shape of the tail, size of the bill and other details con-

nected with this important structure, not only in regard to colour, width, and length, but also the relation of the two parts to each other. The specific name often conveys information about the sounds the bird makes, for it may whoop, trumpet, sing, chatter, warble, babble or hum ; it may tell of its disposition, whether sociable, solitary, or pugnacious. Sometimes the name of the country in which the bird lives is indicated, or it may be the name of the collector or the ornithologist who first made it "new to science." Eponymous specific names are sometimes dignified with an initial capital.

Some scientific names are short and expressive : *Merops viridis* is a green bee-eater ; *Ardea alba*, a white heron ; *Anas cristata*, a crested duck ; and *Haliaëtus vocifer*, the screaming eagle. It often happens that a bird with a short name has a long one in ornithologic language. The entertaining brown and white chat so abundant and attractive around some of the lakes in the Rift Valley becomes *Myrmecocichla cryptoleuca* in the museum catalogue. The longest name belongs to the saddle-billed stork, *Ephippiorhynchus senegalensis*, for it consists of twenty-eight letters ; the beak of this bird is nearly 27 cm. long, and the ugliness of the generic name equals that of the bird to which it is applied : in this instance the length of name also coincides with the size of the subject, for it is a giant among birds. The spoonbilled sandpiper, *Eurynorhynchus pygmæus*, runs this stork close for letters and for eccentricity of bill. Although such uncouth names excite mirth among the uninitiated, they are indispensable to the student.

The majority of birds possessing a top-knot usually have this fact referred to in their common as well as their scientific names. Crested or *cristatus* is a title of distinction among birds, like a knighthood among men. The term crest applies to the plume on a helmet as well as to the mark of ownership

on plate, livery, and stationery of one who has been dubbed a knight.

All birds with crests can erect the feathery tuft. The most familiar example is the crest of the cockatoo. This movement depends on the action of muscular tissue in the skin connected with the quills of the crest feathers, and a large muscle immediately beneath the skin covering the head and nape.

The feathers on the heads of many birds are larger than the contour feathers generally, but do not amount to a crest, although the bird can erect them partially when excited, courting, or engaged in combat.

Many birds in Eastern Ethiopia possess beautiful crests: some of them will be considered. The chief are:—The crowned crane, the hammerhead or tufted umbre, the crested lark, some hornbills, the hoopoe, mouse birds or colies, the secretary bird, and the plantain eaters or touracos.

The hammerhead (*Scopus umbretta*) is a curious bird. *Scopus* is the Latin word for broom, and *umbre* refers to its dark brown colour. All who know the bird will admit the aptness of both names. This bird frequents woody districts near water, wades along the muddy shores of lakes and islets usually in pairs, hunting about for fish, frogs, molluscs, insects, and worms. When this bird erects its crest it looks very weird and justifies the natives in suspecting it of witchcraft.

The umbre roosts in trees, builds a huge nest of sticks and stones and lines it with clay, with an entrance usually at the side.

The Secretary bird is interesting in relation with names common or scientific, for it has received many. The name secretary is supposed to be derived from the tuft of long feathers hanging over the back of the head and resembling a secretary with a quill feather "in his ear." A. Newton, who has written a critical account of the names of this remarkable bird, mentions that it was originally called *Sagittarius* or Archer from its striding

gait which resembles a bowman advancing to shoot, but this name has been corrupted into *Secretarius*. However Secretary Bird is a name which suits, and the scientific name *Serpentarius reptilivorus* describes its habits, for it eats reptiles and snakes, and living in a country where venomous snakes abound, it is protected. I am not likely to forget the pleasure with which I

The Tufted Umbre, or Hammerhead (*Scopus umbretta*). When this bird erects its crest, it looks very weird, and justifies the natives in suspecting it of witchcraft.

watched one of these remarkable birds on the margin of a blackened area left by a grass fire looking after things it could devour. When engaged in killing dangerous prey by stamping on them with its powerful feet, the wings spread, head held high and feathery tuft erect, it appears a formidable bird, for it stands four feet high. This bird has a good appetite and likes variety in food. In the stomach of a secretary bird shot near Cape Town

"there were found one tortoise, eight chameleons, twelve lizards of two species, three frogs, one adder, two locusts, two quails, and remains of other animals" (Stark and Sclater). Bones, feathers and other hard parts of the food formed into pellets are ejected from the stomach. In its encounters with poisonous snakes the secretary bird is sometimes fatally bitten.

The Secretary Bird (*Serpentarius reptilivorus*) resembles cranes and storks, but those who have carefully studied its structure prefer to regard it as essentially a hawk on stilts. It is a striking object on the plain.

Ornithologists have been puzzled in regard to the systematic position of this long legged bird which outwardly resembles the cranes and storks. Those who have closely studied its structure prefer to regard the secretary bird as essentially a hawk on stilts.

Among birds with feathery crowns in Africa the

Hoopoe holds a prominent place, its conspicuous crest attracts the attention of the most casual observer, especially when the bird hops along the ground

The African Hoopoe (*U. africana*) resides in British East Africa.

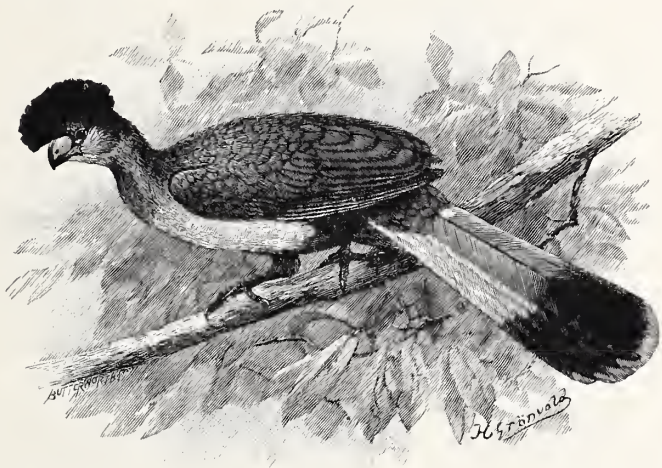
hunting for insects and worms, tapping with its long bill. The hoopoe will also take flies on the wing. It is a gaudy bird but has unpleasant habits and delights to find its food among filth: it builds

a nest in a hole in a tree or wall, using foul material in its construction. It takes no pains to keep the nest clean during incubation and the neighbourhood of the nest becomes unpleasant and often intolerable to man. In the autumn hoopoes when fat are esteemed

The European Hoopoe (*Upupa epops*) visits the Nile Valley and British East Africa.

as delicacies, especially by the Christian population of Constantinople (Newton), and Arabs impute to this bird, especially its head, medicinal virtues. There is a fable connected with the hoopoe: Allah granted to Epops a golden crest, but at the bird's request changed it for one of feathers.

The European hoopoe visits the Nile Valley and British East Africa in winter. The African hoopoe has feathers of a deeper red than the European species and the wing-markings are different. The Wood-Hoopoes of East Africa are interesting birds; they have no crest but a long tail and their plumage is iridescent. These noisy birds climb the trunks of trees in spite of their long tails and hunt for insects in the bark like woodpeckers.



The Great Crested Touraco (*Corythaola cristatus*). This handsome coloured bird has an abundant but untidy top-knot. It is the largest member of the family *Musophagidæ*, which is the Latinised expression of plantain-eater. The noise made by Touracos is one of the characteristic sounds of a Uganda forest.

The Touracos, plantain-eaters or Lowries, are peculiar to the African forests. They are striking birds and arrest attention either on account of the noises they make, or their beautiful plumage. Touracos may be said to haunt the forest and they delight in pursuing each other between the trunks or among the branches of the highest trees. The noises they make resemble men bawling to each other, and similar animal sounds.

A touraco thoroughly deserves the name of "noisy bird" (Lärmvogel) which Germans have given it.

These birds have short serrated beaks, eat bananas, the fruit of papaw trees, insects, worms, and grubs. The heads of touracos are decorated with conspicuous crests; many years ago on this account they were called "crowned birds." Touracos fly with clumsy undulating flight, usually alighting with the crest erect and the tail upturned. As they hop about the branches of trees the tail is in constant motion, the rectrices being expanded and depressed. The crest in some touracos is a feathery mop, but the Great Crested Touraco has an abundant feathery top-knot.

Touracos are remarkable for their colouration, which is the same in both sexes. Some of them are as brilliantly coloured as parrots. In many the flight feathers are crimson and yield a peculiar pigment, called turacin, which contains copper and may be reduced to powder. The colour is so soluble that it is washed out of the quill feathers by heavy rains, but it is renewed. The green in these birds is due to the presence of green pigment in the feather.

The most remarkable crest among birds belongs to the Crowned Crane. This is a very common bird around the Victoria Nyanza. The crowned crane is a purely African form and is common in South as well as East Africa. In winter the crowned crane frequents the banks of the White Nile in thousands. The crest of this beautiful bird is present in both sexes and differs from those of other crested birds in the peculiar character of the feathers composing the crown. The quills of the feathers are small and thin; each shaft (or vane) is twisted spirally and bears a few hair-like barbs, which, owing to the torsion of the shaft, project on all sides of the axial line. The shaft is flat so that the twist gives the feather the appearance of being banded alternately light and dark. The tips of the vanes are dark. At Fashoda I had an opportunity of examining two chicks

twenty days old; the crown was composed of ordinary feathers. When the birds fight they try to pluck out the feathers from each other's crown. Some years

Dissection of the neck of a Crowned Crane showing the pharynx, which is puffed out when the bird dances. (From a preparation by Mr. Burne in the museum of the Royal College of Surgeons, England.)

A. Feather from the crown: it shows the spiral twist and the thin hair-like barbs.

ago a bad-tempered cock at the Zoo would not allow the hen to have any feathers in her crown, and as soon as they grew he plucked them.

Cranes utter loud notes, which are increased by

a peculiar arrangement of the windpipe; this tube is coiled up like a rope and lodged in a hollow space in the breastbone or sternum. This converts the windpipe into a powerful trumpet. Crowned cranes differ from other members of the crane family by

The Kavirondos have great respect for Crowned Cranes and tolerate them in the villages merely for their beauty. These birds are as tame as fowls in a barn-yard.

possessing a straight windpipe. Everyone who has watched the antics of this bird has probably noticed that it puffs the upper part of the neck when dancing. This swelling of the neck is due to inflation of the distensible pharynx with air.

The Kavirondos have great respect for crowned

cranes, which are found in large numbers around the lake: they tolerate them in the villages merely for their beauty. In the quiet of the evening these birds take up positions on the apex of the huts or on the flat top of a tall tree near the village, perched motionless on one leg, silhouetted against the sky, like sentinels.

The Helmet-shrike.

These birds are pretty, very tame, and most amusing when they perform their quaint antics. They dance to meet one another with nodding heads, necks advanced, and wings outspread, bowing and jumping in a grotesque manner. They are as easily approached as fowls in a barn-yard. The Nandi are very fond of the

crested crane owing to its beautiful plumage, and though they eat almost anything, forbid their people eating this beautiful bird.

Some of the shrikes in East Africa are furnished with a crest, which differs from that possessed by most birds, for it extends along the front of the head to the base of the beak. The top-knot in the Helmet-shrike resembles the horse-hair plume in the crest of a Grecian helmet. The crest and plume were probably added to the helmet in order to make the soldiers look terrible to their enemies in time of war and appear more handsome to their friends in time of peace. This same feeling animates all savage races. The Masai to this day wear extraordinary head-dresses made of ostrich feathers, or of the mane of a lion, so that they may terrify their enemies when on the war path.

The feathery crest or top-knot is useful to birds: they use it for fascinating hens and terrifying enemies.

XXX

TAILS AND WINGS AS NUPTIAL LIVERY

The ends of birds, like their limbs (wings and legs), are strangely modified; the variations of the tails of some birds which flourish in Eastern Ethiopia are worthy of consideration.

The quill feathers of a bird's tail are called rectrices, or steering feathers, on account of their action in directing flight. The quills of these feathers are crowded on a narrow base, which causes them to present a fan-shaped arrangement. The normal number of rectrices is six pairs; a few birds have ten or eleven; several nine, eight or seven pairs; and many five pairs. The reduction in number is brought about by the atrophy or disappearance of the outer pair or pairs. The number of rectrices differs among birds of closely allied species, and even in the cock and hen of the same species. For example, the peacock is furnished with ten and the peahen with nine pairs. The variation in the shape of the tail feathers is very great and is a fact well recognised.

The profusion of bird life along the Nile Valley and around the lakes of Central Africa is wonderful, and so is its variety. Some of the biggest birds living on the earth to-day may be seen here. Ostriches, bustards, storks, cranes, secretary birds, eagles, vultures, herons, and pelicans. Size always impresses. Many of the smaller birds, such as bee-eaters, rollers, ibis, sun-

birds, touracos, parrots, kingfishers and glossy starlings are very beautiful. Some are remarkable for their grotesqueness; among them the whale-headed stork, skimmer, hornbill, flamingo and the saddle-billed stork. Eccentricity of plumage is noteworthy in a few, such as the nightjars (goat-suckers), weaver finches, egrets, and hammer-heads.

The first thing about Ethiopian birds that attracted my attention was the number of them that had peculiarly narrow tapering tails, and two which had a superabundance of tail feathers. During my stay in Nairobi the grass on the unoccupied land around the town was in flower and seed. These grass patches were the favourite resorts of large numbers of weaver birds, especially those known as Jackson's Whydah birds. In shape, size, and colour these birds resemble sparrows. At the breeding season the feathers of the cock undergo an extraordinary change, they become quite black with the exception of the long feathers of the wings, and the tail feathers elongate out of all proportion to their previous condition. When the bird flies the tail feathers spread out like a parachute and arch in a peculiar way so that it seems to float rather than to fly through the air. When the bird alights these long feathers diverge and cause it as much inconvenience as a long court train does to a lady when she seeks refuge in a four-wheeled cab. In addition to the extravagant growth of the rectrices, the primaries and secondaries undergo a compensatory enlargement to balance the bird in flight.

It is not uncommon around Nairobi to see a score of these long-tailed finches floating by means of their feathery parachutes over a grass plot. At the end of the breeding season these long plumes drop off and the cock, in the matter of plumage, is similar to the hen. These birds have two sexual seasons annually.

Mr. F. J. Jackson carefully studied these birds, and points out that the cocks of *D. jacksoni* make circular

playgrounds for themselves in the grass in which they dance up and down, especially in the early morning and

Jackson's Whydad bird (*Drepanoplectes jacksoni*) in wooing-dress. In this plumage it may be described as a sparrow in widow's weeds.

late afternoon. In consequence of these tricks they have been called dancing birds.

When these black objects are bobbing up and down

in the grass, the head is thrown back, the beak is horizontal, and the feet hang down. The tail is drawn up until it touches the ruff at the back of the head, the

The feathery dancer in its grass amphitheatre or playing ground.

tips of the feathers falling in a curve downwards, with the exception of two tail feathers which are held outwards and downwards. The wings, half opened, are worked with a very quick, shivering motion, and the

feet move up and down rapidly. As the bird springs up and down the whole plumage is puffed out. The dancing-rings are about two feet in diameter. There is a tuft in the centre, and the grass around it is broken quite close to the ground. There may be a score or more of these dancing-rings in an acre of grass land. These birds associate with the Bishop finches (called dhurra birds in the Sudan), which, at the breeding season, blaze out in bright red and lovely orange feathers.

There is some confusion in regard to the names of these birds. Ornithologists call them Whydah birds, after a place of the same name on the West Coast of Africa; they are called weaver finches, because they construct complex nests, and the Portuguese named them widow birds on account of their sombre plumage and long tails; certainly *D. jacksoni* resembles a sparrow in widow's weeds.

There is an interesting species, *V. paradisea*, in which during the breeding season the webs of the middle pair of rectrices widen greatly and the shafts twist in such a manner that their inferior surfaces become opposed vertically; the next pair are produced to the length of about a foot and are falciform. The bird being no bigger than a canary, it seems, when flying, as if the bird is attached to the tail, rather than the tail to the bird.

The Coly or Mouse-bird is very common in the Ethiopian Region, and is sure to attract attention. It has a pretty top-knot and a long narrow tail. The legs are red and the toes have slender, prehensile claws, all directed forward, but the hallux and the outer toe can be turned backwards. The peculiar redness of the legs can only be appreciated in the living bird. It is curious to watch a coly alight on the trunk, or branch, of a tree and then creep through the foliage like a mouse with the whole of its metatarsus applied to the branch. This bird, like the tits, often hangs head downwards. The coly prefers thickets to

The Coly, or Mouse-bird, has a long narrow tail. The legs are red and the toes have narrow claws directed forward, but the hallux and outer toe can be directed backwards. When a coly alights on the branch of a tree, it creeps along it like a mouse, with the whole of the metatarsus applied to the branch.

forests and is by no means shy, for it frequents trees around houses in Kampala.

Colies have a bad reputation among the settlers, because they steal ripe fruit. The plumage of the cock and hen are almost identical. The colies dart about in flocks of six, eight, or ten. The Masai use the skin of the mouse-bird to decorate their heads.

A Shrike (*Lanius humeralis*), very common around Nairobi; it is very fond of sitting on a prominent branch of a dry, leafless, prickly acacia. In the vicinity of the railway it prefers to perch on a telegraph wire. This shrike has the same habits as the English butcher bird and keeps a larder.

Shrikes are sure to attract attention. The Scarlet-bellied Bush-Shrike is common in the thorn-orchards of the Sudan; it has a flute-like note, usually uttered from a thorn bush. The black and white shrike, like our butcher bird, keeps a larder.

Mr. Hobley informed me that in his garden where the Mauritian Hemp grows freely, this shrike uses the sharp bayonet-like points of the leaves for impaling victims, such as caterpillars, grubs, grasshoppers and the like. Another observer interested in this bird watched it use

The Sunbird (*Nectarinia reichenowi*), male and female. The hen is busy with the flowers of a salvia, and her companion has come to see what she is about. The middle pair of tail feathers is greatly elongated.

a eucalyptus tree for this purpose, and saw it fix caterpillars and slugs on the broken ends of twigs and small branches. On some occasions the bird would exercise great force in impaling its victims.

The Sunbirds are the flower-haunting birds of the

Ethiopian Region; their gorgeous metallic colours—crimson, purple, yellow, blues and green—of their

Tecoma stans: a favourite flower of sunbirds.
A. Perianth in section.

plumage are only excelled by the humming birds of the tropical portions of America.

The sunbirds with their metallic colouration form exquisite pictures as they flit about in the sunshine or hang in all sorts of positions about the stems of flowering plants, for they are unable to poise themselves in the air like humming-birds. The Tecoma is a flowering shrub common in the gardens around Nairobi; it has clusters of fairly large trumpet-shaped yellow flowers. The perianth of these flowers is too deep to permit the sunbird to reach the fundus with its beak, so the bird overcomes this difficulty by pecking a hole in the perianth just above its fundus, and thus obtains easy access to the nectar and the insects it contains.

In some species of sunbirds the middle pair of tail feathers is greatly elongated, and makes this beautiful bird very conspicuous as it flits from flower to flower, usually with the hen, in a restless manner.

Among the latest additions to our knowledge of Ethiopian birds with a long narrow tail is a beautiful sunbird, *Nectarinia dartmouthi*, found in flocks on the lobelia and groundsel zone of Ruwenzori at an elevation of 12,500 feet up to 14,500 feet. These birds feed on the lobelias. In the Report of the Ruwenzori Expedition it is described as a very pretty sight to see them clinging to the side of the tall flower-spikes (see p. 240); their legs held horizontally so as to keep the body away from the flowers, they swiftly probe the long, pale-blue tubes of the blossom with their curved beaks. The males are incessantly fighting with one another, or flirting with the females, and each pair seems to claim a district as its own, from which all trespassers are harshly and noisily chased. They show little or no fear of man, and one actually settled upon the barrel of Mr. Carruther's gun while he was standing still.

This reference to each pair of birds claiming a district and driving away trespassers is interesting, for when birds fight the combats are commonly regarded as "rows about hens," whereas they are often "struggles for

territory." Our common English blackbird is very pugnacious in regard to trespassers along his hedge and ditch.

Sunbirds are very fond of the tree-lobelias. When Count Teleki made an ascent of Kenia and had attained an altitude of 11,600 feet the party was astonished at the appearance of sunbirds (*Nectarinia deckeni*). A nest with a chick in it was found and placed in front of the tent and the male appeared "in all the beauty of his bridal plumage."

One of the most conspicuous birds in the Rift Valley is the bee-eater, and it is interesting to watch this bird perched on the leafless bough of a tree from which it makes short flights after bees, wasps, or insects which it captures on the wing after the fashion of a fly-catcher, and displaying its brilliant colours. The tail of this bee-eater is peculiar, in many species the twelve rectrices end squarely, but in Merops the two middle feathers are prolonged far beyond the others, forming a median tapering point.

The bee-eaters are not shy birds, and will allow a close approach, and they also pick ticks from the backs of cattle. A. H. Neumann found bee-eaters numerous around Lake Rudolf: indeed *Merops nubicus* was very friendly with the large crested bustard of that region, and had the habit of riding on the bustard's back. The bustard did not "resent the liberty," but stalked majestically along whilst its brilliantly clad little jockey kept a look-out, sitting sideways, and now and again flew up at an insect it had espied, returning again to its "camel," as Juma the gunbearer not inaptly termed the bustard.

The bee-eater also sat on the backs of goats, sheep and antelopes, but the bustard was its favourite steed. Neumann suggests, and probably rightly, that the bee-eater found the back of the bustard a point of vantage to see and pursue insects in a country where suitable sticks to perch on are few. It was a common sight to see bee-eaters mounted on bustards. On one

occasion Neumann saw a rose-coloured bee-eater try to use a stork as a steed, but it would not submit to be ridden.

It is a common belief that the birds of the Ethiopian Region are deficient in song. Livingstone did not

The Crested Bustard (*Eupodotis kori*) with the Bee-eater (*Merops nubicus*) riding it like a jockey. The two median elongated rectrices are conspicuous in the flying bird. (From A. H. Neumann's *Elephant Hunting*.)

share this opinion, for he wrote: "African birds have not been wanting in song, they have only lacked poets to sing their praises, which ours have had from the time of Aristophanes downwards. Ours have had a classic and a modern interest to enhance their fame."

Many English birds delight us by their habits and associations; a few charm us with song, but many make noises which can scarcely be called music, for example, crows, rooks, cranes and jays. The songs, noises and tricks of birds have been celebrated in

phrase and fable from the earliest dawn of eivilisation. The hawk and ibis were worshipped by the aneient Egyptians, and in Christian worship some birds are symbols of the highest qualities of human nature. The dove is the symbol of the Holy Spirit and the human soul, as well as for tenderness and eonjugal love. A pair of turtle doves yoked to the chariot of Venus eonveyed the goddess of love through the skies.

The Eagle, King of Birds, was used as an emblem of empire by the Babylonians, Persians and Freneh, and as an omen of Vietory by the Greeks and Romans. As the emblem of St. John it serves, with outstretehed wings, as a lectern in many thousand Christian ehurches. Birds find a plaee in our literature, whether it eoneerns Religion, Art, Poetry, Fables, Carieature, Comedy, or Tragedy. Their names are so ineorporated in our language that at least a hundred are used as surnames by the people, sueh as erow, rook, jay, raven, hawk, buzzard, gull and fineh, with several prefixes, such as gold, green, &e. The robin is so popular that its name is eommon as a Christian name as well as a surname. Many martins, swifts, swans and drakes will be found even in a Court Guide.

Now we are beginning to learn something of the language and soeial eustoms of the natives of Eastern Ethiopia, it is elear that beasts and birds have a plaee in their superstitions.

Hollis has reduced to writing some instanees from the folk-lore of the warlike and savage Nandi.

To them the francolin ealls to the hyæna in the morning :—

Hide in the wood.

The lion growling says :—

The owner of a cooking-pot is lucky, he can cook his meat.

There is a small bird whieh builds a nest in the ground. To anyone going near the nest it cries :—

Don't tread on my head.

When the intruder goes away it laughs, and cries :—

I have told you lies.

When the ground hornbill is foraging, the hen bird calls to her mate :—

Peep, peep into those holes.

The cock replies :—

I have looked, I have looked, there is nothing.

People with ideas of this kind are not lacking in imagination. Æsop was a freed slave, probably an Ethiopian : who can deny that a story-teller with the genius of Æsop or of Krylof may not exist in a Nandi village to-day.

There are sounds made by birds in Eastern Ethiopia which should delight English ears. The diminutive long-tailed dove uttering its plaintive note in the woods of the Kikuyu country and around the lakes of the Rift Valley in the early morning is most delightful. The ringing noises of the touraeos in the wood are like human voices. Some of the birds have flute-like notes ; those of the organ shrike denote the neighbourhood of water, and its bell sound makes the listener fancy that a blacksmith is working near at hand. There are many species of larks in the Ethiopian region, and some of them sing. In British East Africa one, known as Fischer's Bush Lark, makes a peculiar noise with its wings. In the breeding-season as the bird soars it produces a peculiar rattling sound. Schillings compares it to the sharp rhythmical clapping sound produced by rattling together small pieces of lath The sound, audible a long distance, is very deceiving, for it appears to come from a wood near at hand, but the bird is high in the air.

A bird known as the Coucal, or Lark-heeled Cuckoo (because of the long spur on its hind toe like that of the lark), haunts papyrus swamps. It is clumsy on the wing

The Coucal perching among papyrus rushes. The inset shows its powerful foot and long spur.

and skulks in the reed-beds, where it makes a peculiar whoop-whoop, and is often noisy in the early morning and at eventide. The coucal has powerful feet, which enable it to clutch the smooth slanting stem of the papyrus, and sometimes slides down it like an acrobat. The bird looks very handsome when it perches in the

The Racket-winged Nightjar (*Macrodipteryx macrodipterus*) has the ninth primary elongated in each wing. When flying in the dusk it appears like three birds—a big bird with two smaller birds mobbing it.

middle of a papyrus umbel, its dusky white breast and belly and chestnut head, back, wings and broad tail then showing to great advantage.

One species of coucal makes a noise like water gurgling out of an inverted bottle; for this it is sometimes called the "water-bottle bird."

It is more common for the tail feathers to elongate in

birds which assume an extravagant wooing-dress than those of the wings; but in some Nightjars the wing-feathers are strangely lengthened. The nightjar family has soft owl-like plumage, which is peculiarly modified in some species. Among those living in Africa, two, the Racket-winged and the Pennant-winged species, are

The Pennant-winged Nightjar (*Cosmetornis vexillarius*). "The aeronaut of the dusky evening." In the eventide they look like ghosts as they flit in and out of the long grass.

remarkable for peculiar modifications of certain feathers in their wings.

The Racket-winged Nightjar has the ninth primary elongated in each wing: it appears with a long bare shaft and a racket-like tip. When flying in the dusk it gives the impression of being three birds—a big bird with two smaller birds mobbing it. Sometimes it resembles a fluttering kite. This species occurs in the Rift Valley and especially round Lake

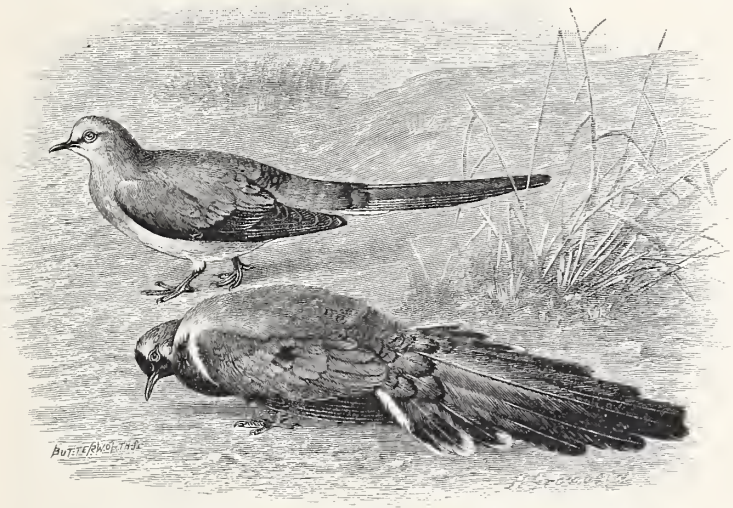
Baringo. These long feathers are only retained during the breeding season, and they are used for display. When wooing, the cock drops noiselessly on the ground in front of the hen and moves the wings in such a way as to wave the standards over his head in front of her. It is a mistake to suppose that these long feathers are moved independently of the wing; like the other secondaries their quills are fixed to the bone (Ulna).

Selous found the racket-winged nightjar very common along the river Chobe. He states that they lie very close during the daytime, and when disturbed only fly twenty or thirty yards, and again alight and lie close to the ground. The hens lay their eggs on the bare ground, and when sitting will almost allow themselves to be trodden on before moving. On one occasion, "four horsemen and about thirty Kaffirs walked past within a yard of a sitting nightjar, in single file."

The Pennant-winged Nightjar has the seventh, eighth, and ninth primaries prolonged, especially the ninth. In some of the birds the quills measure twenty inches, and the bird is only ten inches long; in the eventide they look like ghosts as they flit in and out of the long grass. Schweinfurth watched these birds in the "heart of Africa," and observed that they make their earliest appearance about a quarter of an hour after sunset and as the twilight passes rapidly into thorough night. For the purpose of catching insects they generally wheeled in circles at no great distance from the ground. The range of their flight was very short and extremely circumscribed. The antipathy of this "aeronaut of the dusky evening" to the clear light of day seemed very remarkable; it kept itself to the seclusion of the low brushwood; often it would settle itself on the ground in a pile of leaves to which its own hue corresponded, and then it might almost be trodden on before it could be stirred to flight. The disinclination of the nightjar for long flights when in full feather is due to the hindrance such elongated pinions offer

when the bird flies. In favourable localities a dozen pennant-winged nightjars may be seen in the air together; they then resemble "tattered pieces of paper blown about by the wind." (Woosnam.)

The legs of nightjars are so short that the progress of these birds along the ground is little more than a shuffle. Their feet present other unusual features. The fourth or outer toe has only four phalanges instead of five and the claw of the middle toe is serrated.



The long-tailed African dove (*Œna capensis*). It is scarcely larger than a wagtail and abounds in Eastern Ethiopia.

Nightjars are said to use this pectinated claw to detach the hooked claws and chitinous wings of insects on which they feed from the bristle-like feathers which fringe their mouths.

As in the case of other crepuscular birds, nightjars are occasionally seen flying at dawn. The scissor-bill, from which the drawing on p. 350 was made, I shot at sunrise.

The tails of birds and beasts are often used by the natives for personal adornment and use. Although the

men and women disdain clothes they love to decorate their heads. Ostrich and marabou feathers hold as high a place in the scale of fashion among Ethiopians as among the milliners of Bond Street.

The Masai wear a head-dress of ostrich feathers when raiding, in order to inspire terror (p. 93). The Karamojo, Suk, and Turkana stick them in their chignons (p 160). The Kavirondos use feathers in the construction of their enormous head-dresses. A British Field Marshal wears a plume in his helmet which helps to emphasise his rank, but these feathers are usually obtained from the tail of a barnyard fowl.

The long hairs of a giraffe's tail are used as threads for sewing, or for stringing beads. European sportsmen who shoot elephants, collect the horn-like hairs from the tails for their female relatives and friends to fashion into bracelets. British surgeons often use hairs from a horse's tail for suturing wounds. The Masai employ the tuft of a gnu's tail as a fly-flap, and it is extremely useful in a land abounding in flies and gnats.

XXXI

IVORY

From time immemorial certain natural productions in the mineral and animal world have been highly esteemed for artistic and decorative purposes. Among such substances gold, silver, marble, precious stones, and ivory have held leading places.

Among these materials ivory holds a peculiar position, inasmuch as it is the most durable substance furnished by the animal kingdom. Moreover, ivory, like gold, silver, and diamonds, cannot be made artificially, and no satisfactory substitute has been devised to supply its place in the various arts and industries of the civilised world.

Ivory is known to anatomists as dentine and it enters into the formation of the teeth of mammals, but the term ivory is restricted by use to the dentine of those animals in which it occurs in sufficient quantity to be useful for industrial and artistic purposes. Such mammals are the elephant, hippopotamus, narwhal, sperm-whale, and walrus.

The chief source of the best ivory to-day is the tusks of the African elephant. The tusks are the permanent upper incisors of this huge mammal; they not only surpass other teeth as belonging to an animal so enormous, but they are the largest of all teeth in

proportion to the size of the body. The remarkable sub-order of vertebrate animals, *Proboscidea*, includes the elephants living on the earth to-day and their ancestors. These mammals are remarkable for the length of their trunks and the size of their tusks. The best known ancestor of the elephant is the mammoth; it roamed in the mighty forests which formerly covered Siberia, and had enormous tusks, some of which weighed 250 pounds: its remains have been found in Europe, in England, and in Ireland. Mammoths existed in the Siberian forests in vast numbers, for the fossilised tusks of this huge animal have been a regular article of commerce for centuries, especially in China and Russia.

Dr. Breyne, writing in 1737, states that the teeth of mammoths have been "a remarkable and particular curiosity of Siberia." These teeth are found "in such quantity as is sufficient for trade." He also mentions that the chief failings of mammoth-ivory are brittleness and liability to turn yellow on exposure to the weather or heat.

Elephants are strict vegetarians; they feed on herbage as well as on the leaves and soft branches of trees. This food is seized by the wonderfully mobile trunk (or proboscis) and conveyed to the mouth. The trunk, which is formed by a combined prolongation of the nose and upper lip, compensates the elephant for the shortness and inflexibility of its neck. In Africa elephants are fond of bananas and green plants, and when they visit the plantations of the natives they not only eat bananas freely, but destroy a larger quantity by their trampling. These huge animals congregate in herds and make long journeys at night in order to obtain water and food.

When elephants have appeased the pangs of hunger and quenched their thirst they sometimes become playful. It was officially reported in 1909 that the telegraph line on the Bahr-el-Zeraf had been inter-

rupted by elephants on nine separate occasions between January and April. This being the dry season, these animals come down in herds to this tributary of the White Nile to drink : they jostle against the telegraph poles and knock them down. When a pole is down the

A Useful Association. Buff-backed Heron on an elephant. When elephants are suspicious they raise their trunks and move them incessantly in order to scent danger.

wire falls low enough to touch the backs of the elephants, and this leads to a large amount of damage, and, in some instances, the telegraph line is destroyed for half a mile. Occasionally an elephant uproots a telegraph post and twists the iron pedestal to which the pole is bolted (see p. 26).

A herd of elephants is often accompanied by a flock of buff-backed herons. When the herd moves the herons follow on the wing, and hover over, or on its flanks, like a white cloud. When the elephants are at rest, or feeding, these birds alight, and rid them of vermin. In reference to this, Livingstone wrote : the ox-pecker is a better horseman than the heron, for it sits on the withers of a buffalo when the animal is at full speed (see p. 193).

The tusks of the elephant grow throughout life, for they possess persistent pulps like the incisors of rats and rabbits, and the only check to their length is the wear and tear to which they are subjected in digging up roots, uprooting small trees, or stripping them of bark : one tusk is used more than the other, usually the right, and is called for this reason the *servant* by the Arabs. They are also used for offence and defence, and vicious bulls sometimes break their tusks fighting rivals. In Equatorial Africa the elephant attains its greatest size. A. H. Neumann gives the average height of the full-grown bull elephant at $10\frac{1}{2}$ feet. The tusks of such an animal may weigh anything from 50 to 100 pounds, or more. There is a tusk of *Elephas africanus* in the Natural History Museum 10 feet long and 2 feet in girth ; it weighs 228 pounds. Although tusks are present in both sexes of elephants, they are much larger in the male.

A tusk consists of two parts ; a basal portion lodged in the bone of the upper jaw, and a portion which projects beyond the animal's lips. When an elephant is killed, it is wise not to attempt to chop out the tusks at once, as this injures the ivory : in a few days, the tusks loosen and are easily removed.

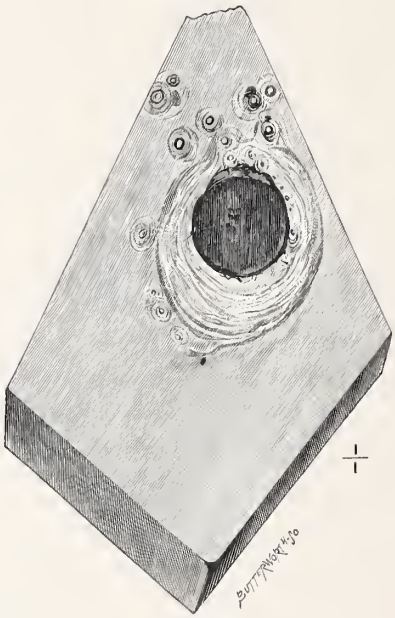
When a dried tusk is split longitudinally its basal part will be found to consist of a conical chamber, the walls of which, near its wide extremity, are very thin. The remaining two-thirds are solid, but a close examina-

tion will reveal a very narrow central area filled with irregular hard tissue representing the remains of a central canal. In the living animal the large basal cavity is filled with living tissue known as the pulp: it contains, among other things, blood-vessels and nerves. The walls of the pulp chamber are lined with a layer of cells (odontoblasts) which are concerned in forming the dentine (or ivory). Under normal conditions the active formation of dentine continues as long as the elephant lives, so that whilst the tusk is being worn down at the tip by use, it is continually renewed by the odontoblastic cells in the pulp chamber.

It occasionally happens that the pulp becomes disturbed by inflammation which may be caused by injury, such as fracture of the tusks by fighting, by musket balls, by spears or some such contrivances used by the natives for the destruction of the elephant. Interference in a violent form with the pulp has a detrimental effect on the formation of ivory which is of some interest. Sportsmen who hunt the African elephant endeavour to kill this animal with what is known as a heart shot. This may be effected by shooting it through the shoulder, or by a shot directed into the chest from the front. In some circumstances the hunter must take his chance of what is known as the forehead shot, and occasionally the bullet penetrates to the brain. A more reliable method of reaching the brain is to aim at the centre of a line drawn from the eye to the ear-hole. A bullet entering at this spot is always fatal. A bullet badly aimed at an elephant's head is very liable to embed itself in the large pulp cavity of a tusk and the elephant escapes death. In such an event the pulp continues to form ivory and as a consequence of the irritation caused by the presence of the foreign body, the hard material which forms around the bullet differs from true ivory and is known as secondary dentine.

Ivory turners have known for more than a century

that hard bodies such as bullets and spear-heads are occasionally found embedded in the solid parts of elephants' tusks without any sign existing on the surface of the tusk to indicate the point of entry. Many observers, among them Blumenbach and Cuvier, noticed that the tissue in which foreign bodies are



Iron ball surrounded by secondary dentine, embedded in the solid portion of an elephant's tusk. (Museum of the Royal College of Surgeons, England.)

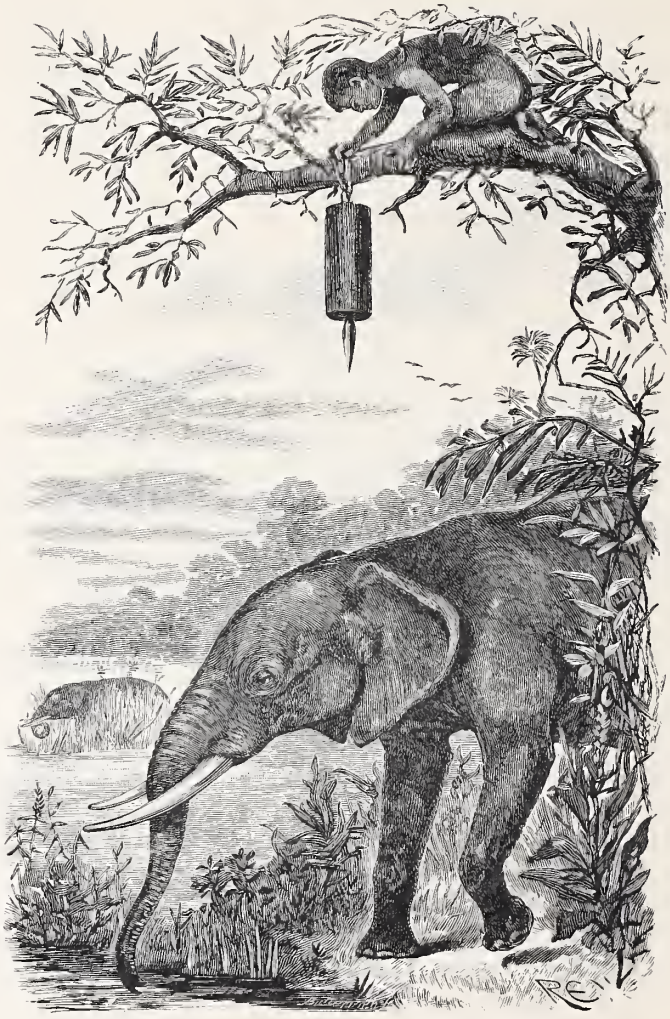
embedded differs in appearance and texture from true ivory. Goodsir (1841) investigated the matter and furnished a satisfactory explanation. When the ball hits the free portion of the tusk, if it only penetrates to a certain depth, no change takes place and the breach is not repaired. When the ball enters the pulp chamber through the side of the tusk, the hole in the

tusk is repaired by the formation of secondary dentine, and the offending body is encapsuled by the same material. As the tusk advances in its socket, the bullet is gradually incorporated in solid ivory. The thorough way in which a bullet may be embedded in the solid part of an elephant's tusk, and no mark betray it, is proved by the fact that one has been found in a billiard ball. Such a specimen is preserved in the museum of the Royal College of Surgeons, England.

These things happened in the days of muskets and black powder: the introduction of the rifle and high velocity bullets has completely changed elephant-shooting. African elephants are often killed by a single well-placed bullet. Compare this with the description of the shooting of the famous elephant Chunee in 1826 at Exeter Change, a wild beast show off the Strand near the Lyceum. Chunee became dangerous and a detachment of infantry was employed to kill him: one hundred bullets were fired into the wretched animal for this purpose. The skeleton of this elephant is preserved in the museum of the Royal College of Surgeons, England. When the skull was examined after the skeleton had been macerated a large abscess was found at the root of one of the teeth, which partly accounted for the trouble Chunee caused the keepers.

When we reflect on the agony human beings suffer in consequence of an abscess in the pulp of a molar tooth, it appears difficult to estimate the suffering endured by an elephant when the pulp of a tusk is inflamed.

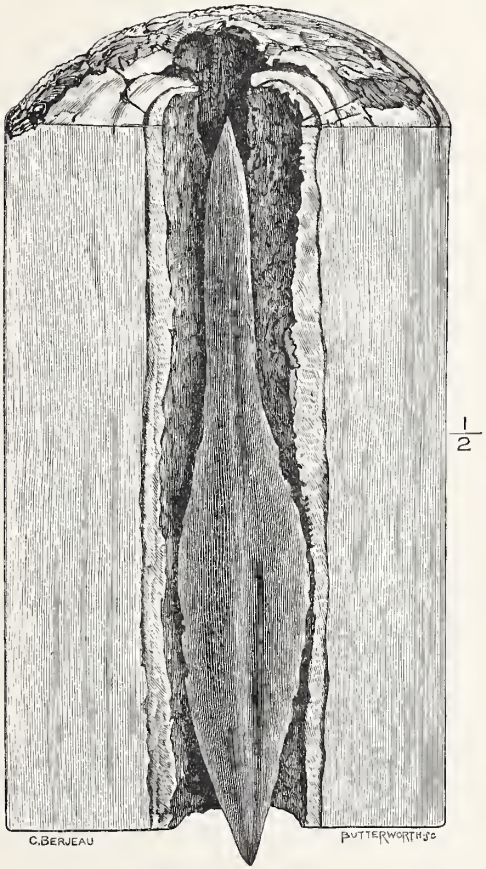
It is possible for a solid body to enter the pulp chamber without penetrating the wall of the tusk. The open end of the tusk looks upwards, and as the natives have a way, among others, of killing elephants by dropping a heavy loaded spear upon them from a tree, or as the result of a trap, it sometimes happens that the spear penetrates the open end of the tusk and is



A sketch illustrating one method by which the African native attempts to kill an elephant. He drops a heavily loaded spear upon the animal when visiting a drinking pool.

lodged in the pulp. The frightened animal rushes about, breaks the shaft of the spear, and leaves the iron head embedded in the pulp chamber. Such a

weapon becomes enclosed in secondary dentine, and is eventually found in the exserted part of the tusk.



Portion of an Elephant's Tusk in section. An iron spear $7\frac{1}{2}$ by $1\frac{1}{2}$ inches is enclosed within it by a capsule of secondary dentine. There was nothing on the exterior of the tusk to indicate its presence. (Museum of the Royal College of Surgeons, England.)

These elephant spears are formidable things. Stanley refers to one found in his second journey from Fort Bodo to the Albert Nyanza, shortly after

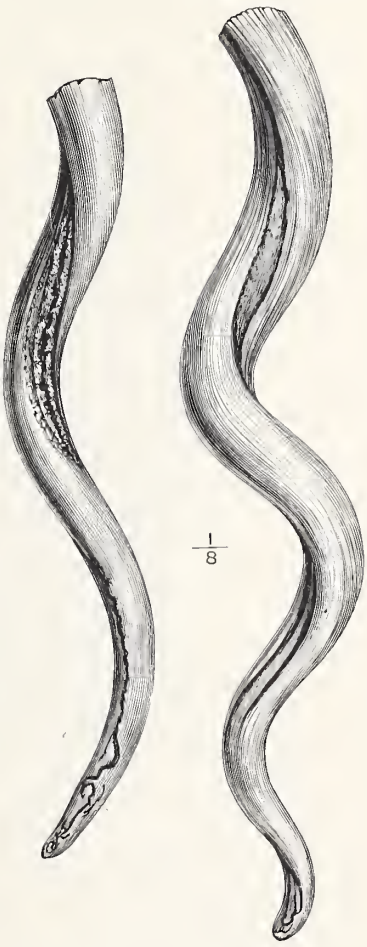
leaving the Ituri river, in the following terms :—"On the road before leaving the bush we passed a place where an elephant spear had fallen to the ground, and buried itself so deep that three men were unable to heave it out. Such a force, we argued, would have slain an elephant on the instant. (April 8, 1888.)"

In some districts the natives kill elephants in enormous numbers and without discrimination, not for the tusks merely, but for the meat and hides. In 1895 the Homr and Rizighat Arabs killed about 800 elephants. The Homr killed 87 in one day. (Soudan Reports for 1895, p. 129.)

Many years ago there was an African elephant in the menagerie of the Zoological Society, London, which attained some notoriety under the name of Jumbo. This animal, when in his prime, possessed two broken tusks which projected through the skin of the cheeks. The stunted condition of the tusks was due to the fact that in a fit of passion (must) Jumbo broke his tusks within their sockets. This led to the formation of an abscess, and the elephant became so ill that it seemed likely to die. A. D. Bartlett, the able superintendent of the Gardens at that time, attempted to open the abscess by thrusting a spear into it from a loft in the elephant-house, but only succeeded in making a deep cut in the hide. Jumbo could not be persuaded to go near the gallery again. Subsequently Mr. Bartlett fashioned a steel instrument about eighteen inches long. One end was hook-shaped, and the inside edge of this hook was ground sharp like a knife. The lower end was ring-shaped, and to it a stout cord was tied. Bartlett, with the assistance of the elephant-keeper, adroitly slipped the hook of the instrument into the slit in the hide made at the first attack, and, by hanging on the rope, forced this crude knife into the abscess and let out a large quantity of blood and pus. A quarter of an hour later, the elephant, sensible of relief, willingly knelt down and allowed them to syringe

out the abscess cavity with warm water. Subsequently an abscess formed in connection with the stump of the other tusk: this was opened with a pruning knife and without resistance from the huge patient.

It is quite common to find masses of badly formed dentine as big as potatoes in tusks, occasionally free in pulp cavity, more often attached to its inner wall like a stalactite. Sometimes a tusk consists of a wall of variable thickness enclosing a cavity extending throughout its length into which the hand and forearm can be easily introduced. The cavity of such a tusk usually possesses rough masses of secondary dentine on its walls. It is not uncommon on dividing the solid part of a tusk to find a piece of secondary dentine completely embedded in the ivory. Small pieces of hard tissue, resembling in size and shape split peas or beans, are very common in tusks. These defects are known in the trade as "beans."



Spiral Tusks. This abnormal curving is due to disease limited to a part of the pulp causing the ivory to be formed more slowly (and badly) on one side than the other. (Museum of the Royal College of Surgeons, England.)

Every large collection of tusks contains some of a spiral shape. This abnormal

curving is due to disease limited to a part of the pulp causing the ivory to be formed more slowly on one side than the other. Some of these spiral tusks contain large tracts of secondary dentine.

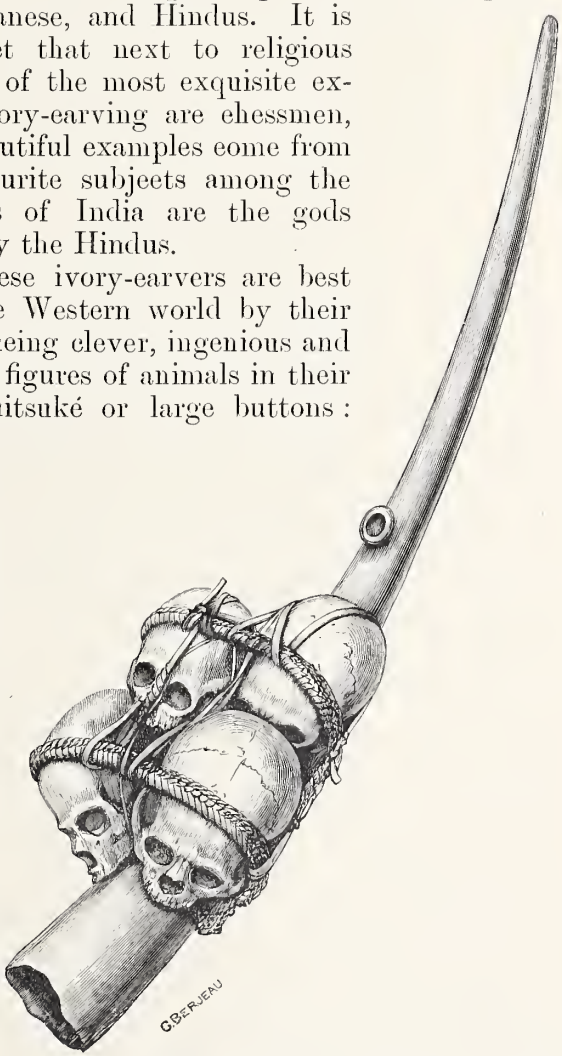
Small ivory panel in bas-relief. Egyptian monarch wearing head-dress, decorated with the uræus. In the right hand he holds a lotus flower by the stem. Egyptian style: N. W. Palace, Nimroud. Carved by Phœnician artist in imitation of Egyptian designs, B.C. 850–700. (British Museum.)

A regular craft known as ivory-turners and ivory-carvers has existed in Europe for centuries; favourite subjects are portraits of the Saviour, crucifixes, saints, Bible scenes, and the like. Some of these beautifully carved objects are regarded as treasures in many museums. Rich collections of ivory-carvings are exhibited in the British Museum and at South Kensington.

Ivory work attained great perfection among the Chinese, Japanese, and Hindus. It is a curious fact that next to religious objects some of the most exquisite examples of ivory-carving are chessmen, and many beautiful examples come from China. Favourite subjects among the ivory carvers of India are the gods worshipped by the Hindus.

The Japanese ivory-carvers are best known in the Western world by their skill in producing clever, ingenious and often life-like figures of animals in their well-known nitsuké or large buttons: some of them are made from the tusk of the narwhal, and tourists are often invited to buy them on the ground that they are made from the horn of the unicorn.

Ivory is also employed as an inlay material for fancy tables, and it has even been used in bulk for the construction of chairs and thrones. Solomon's "Great throne of



The natives of East Africa and the Congo Forest fashion trumpets from tusks. A powerful man can make a great noise with one. On the West Coast they are used in fetish worship. (British Museum.)

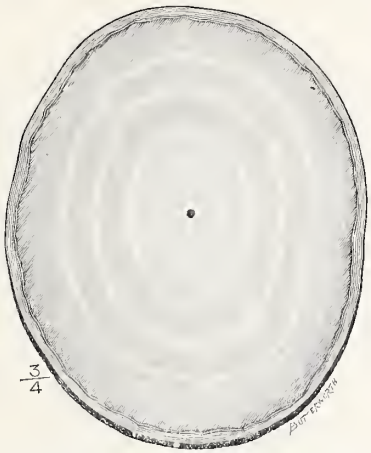
ivory" (1 Kings x. 18) must have been a cunning piece of work; it was overlaid with the best gold and ornamented with figures of lions. Ivory is a material frequently mentioned in the Old Testament.

Layard during his excavations at Nineveh found some pieces of ivory (now preserved in the British Museum) which probably existed nearly a thousand years before Christ.

Among the many interesting objects made from elephant-tusks are billiard balls. A good ball should be perfectly spherical, but it continually tends to become ovoid. Tusks recently removed from elephants are described as "green"; as the ivory dries it whitens, tends to become brittle and break up into concentric layers. When a tusk is divided transversely the cut surface has an elliptical outline, and in the middle of the section there is a rounded piece of secondary dentine representing the remains of the pulp chamber, this ivory-turners call the "nerve." Ivory is deposited in layers, therefore the cut surface offers a series of concentric rings especially obvious in green tusks. The outer layer is technically known as "bark." As ivory dries it shrinks and experience has taught the ivory-turner that a tusk shrinks more in width than in length. To meet this peculiarity the best billiard balls are prepared from tusks which have a diameter very little greater than that of the ball. In such circumstances the shrinking will be fairly uniform. The tusks of cow-elephants are preferred for making billiard balls, especially those which weigh about twelve to sixteen pounds: these are known in the sale-room as scrivelloes. They are not so curved as larger tusks and the so-called nerve is less conspicuous, and in selecting tusks for making billiard balls it is necessary to take those in which the nerve is central; otherwise the ball will have a bias and be untrue. The remains of the pulp chamber can always be detected in a billiard ball; the better the ball the

smaller the area of the secondary dentine. In the spot ball, the bead is usually let into the "nerve."

On one occasion a billiard ball received a smart stroke from a cue; to the astonishment of the player a large core of secondary dentine as thick as a thumb fell out. This core traversed the complete axis of the ball.



Transverse section through an elephant's tusk showing its elliptical outline, remains of the pulp chamber, the concentric rings and bark.

The specimen is preserved in the museum of the Royal College of Surgeons.

The billiard ball is turned in the rough and kept in a warm room at an equable temperature for two years: it is then turned true. A well-seasoned billiard ball should be a perfect sphere with a diameter of $2\frac{1}{16}$ inch, and weigh five ounces. Its contour is always changing; it tends to become ovoid. In addition to this inherent change, an ivory ball contracts with cold and expands with heat. During a match, expert players take care to avoid the balls becoming chilled by currents of cold air, as they are then irresponsive to fine strokes.

D D

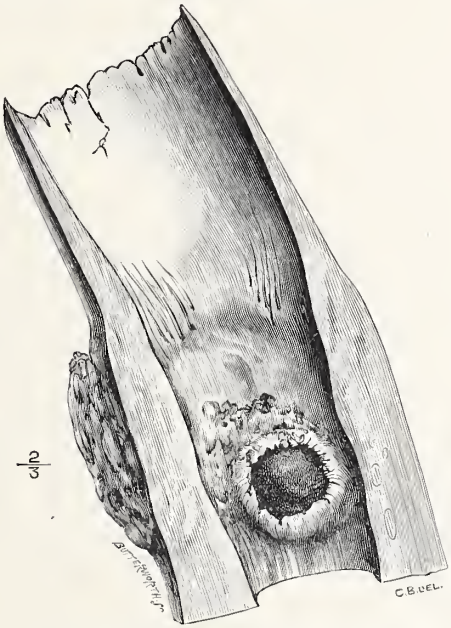
There is something very characteristic in the "click" when two balls cannon: some players believe it to be inimitable. Some years ago, two men in New York were at billiards and the player claimed a cannon: his opponent disputed it. A friend in the room supported the player's claim, he "heard the click." Later on, when playing had been discontinued they heard the "click of contact," but it was produced by a mocking-bird in the saloon.

All billiard balls look alike to an untrained eye: they seem alike to inexperienced players, but not to experts. An untrue ball will run comparatively straight under a smart stroke from the cue. A stealthy stroke from an expert player reveals flaws in the contour of the ball, or of the cloth. Imagine then the suffering which Sir William Gilbert inflicts on the billiard sharp in his delightful comic opera, *The Mikado*, when he condemns him to play extravagant matches:

> In fitless finger stalls
> On a cloth untrue,
> With a twisted cue
> And elliptical billiard balls.

In mediæval times the amount of ivory exported from Africa excited the astonishment of travellers. To-day the best and largest tusks come from Equatorial Africa and the number exported excites the curiosity of tourists. The number of tusks which passed through the Sudan Customs Office during 1905 was 4,954, representing a value of about £42,000 (*Government Reports*). The industrial world requires and obtains 600 to 800 tons of elephant ivory annually. Ivory Sales are held in London four times yearly. At the quarterly Ivory Sale, July, 1910, the tusks offered for sale weighed $66\frac{1}{4}$ tons: they were imported from East Africa, West Africa, Abyssinia, the Sudan, and Siam. In addition to elephants' tusks there were tusks from the following animals:—walrus, narwhal, hippopotamus, wart-hogs, and boars: also a quarter of a ton of rhinoceros horns.

In Great Britain the best ivory is used for making billiard balls, but the largest tusks are bought for the American market. Fifty per cent. of ivory imported into America is used for piano keys and in India for making bangles. The best tusks fetch in the open market £68–£70 per hundredweight. A visit to an



Iron ball projecting into the pulp chamber of an elephant's tusk. (Museum of the Royal College of Surgeons, England.)

ivory sale teaches that even chips are too valuable to waste, for when calcined in a close vessel they furnish charcoal; this, known as ivory black, forms a pigment for oil and water-colours, also an ink for printing engravings.

Some notion of the life of an ivory trader, with which slave-trading was also combined, may be gathered from a perusal of Bode's *Life of Tippoo Tib*. When this enterprising Arab raided Nsama's country, among

other booty he secured 1,950 frasilas of ivory. Tusks at that time were worth £7 per frasila (35 pounds). In some of the villages deep in the interior of Africa a pair of large tusks could be bought for a few yards of cotton sheeting or some beads. Mr. F. J. Jackson traversed the slopes of Elgon in 1891, and found elephant-tusks cheap and plentiful; the natives had no use for them except to make armlets, etc.; a tusk weighing sixteen pounds could be purchased for six strings of beads. Many tusks are obtained from elephants which die a natural death, especially in the localities described by natives as "places where the elephants go to die" (see p. 190).

The difficulty is not so much in obtaining ivory, but in conveying it to the coast, especially when carried by men; often one tusk makes a load for a porter.

The hunt for ivory in Africa has had some of the romance, and been attended with as much misery, as the search for gold entailed on the natives of South America. Mary H. Kingsley's observations on the West Coast of Africa led her to express the opinion that "Ivory is everywhere an evil thing, before which the quest for gold sinks into a parlour game." In days gone by, every elephant-tusk brought to the coast by Arab caravans might be regarded as a silent record of human misery and woe.

Breyne, J. P. ... ... "A description of some mammoths' bones dug up in Siberia," *Philosophical Transactions*, 1737.

Brode, H. ... ... *Tippoo Tib.* London, 1907. (Translated by H. Havelock.)

Potten, J. H. ... ... "Carving," *Encyclopædia Britannica.* 9th Edition. 1876. Vol. V.

Stanley, Sir H. M. ... *In Darkest Africa.* Vol. I.

Stevenson, H. W. ... "Billiard Balls," *Evening News*, Feb. 26, 1910.

Tomes, C. S. ... ... "Ivory," *Encyclopædia Britannica.* 9th Edition. 1876. Vol. XIII.

XXXII

THE HIPPOPOTAMUS

At one time this unwieldy pig was distributed throughout the rivers and many lakes of Africa; its range is more restricted now. The country around the Nyanza sources of the White Nile may be described as a paradise for hippopotamuses. These animals abound in the marshes of Uganda and the Victoria Nyanza, and in the papyrus swamps of the Bahr-el-Gebel, Bahr-el-Ghazal, and Lake No.

A full-grown hippopotamus will measure from its lip to the tip of the short tail fourteen feet, stand five feet high at the withers, and have a girth of fourteen feet. It has an enormous mouth, which is furnished with long, formidable teeth; in spite of the size of the teeth, the lips are so large as to completely conceal them when the mouth is closed.

The teeth have peculiar characters. The incisors and canines, like the tusks of elephants and boars, grow persistently. The incisors in the upper jaw are curved and directed downwards, but the spear-like incisors in the lower jaw are procumbent. The canine teeth or tusks are curved and grow continuously; their increase in length is kept in check by attrition of the canines in the upper against those in the lower jaws. Occasionally the antagonism of these teeth is so imperfect that the persistent growth is not kept in check by wear.

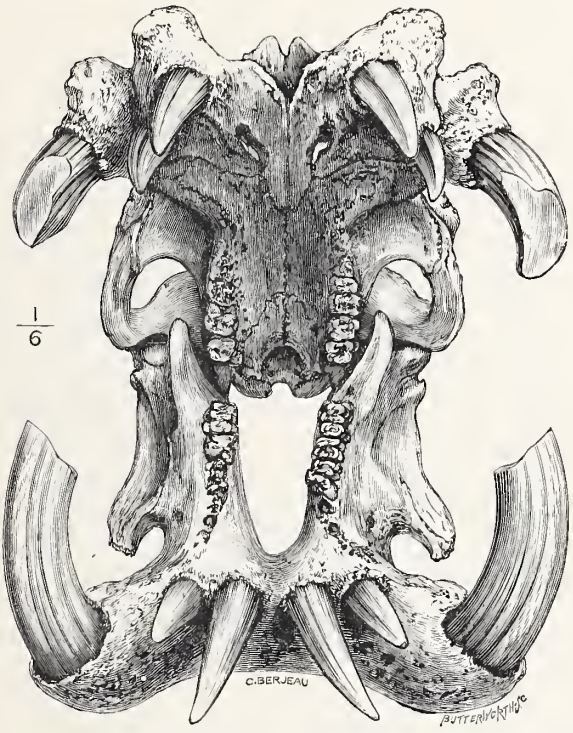
In these circumstances, the tooth continuing to grow in a circle, its point will sometimes re-enter the jaw, penetrate its own pulp chamber, and form a complete ring of ivory. I have seen several canines from hippopotamuses which have formed two-fifths of

The hippopotamus is an ugly and apparently awkward brute, but it can make its way up a steep bank with remarkable quickness.

a circle and one which is a complete ring, the growing point and the root being in actual contact. It is difficult to imagine the agony associated with such an untoward condition. The tusks of boars are liable to a similar abnormal growth, and among savage races of men such circular teeth are worn as charms. I have

been informed that the natives in some of the Polynesian islands remove the upper tusks of the boars in order that the lower tusks, lacking antagonists, shall grow in a circular manner and become valuable as charms.

The hippopotamus uses its canines and incisors like an agricultural spud for rooting up the grass



The skull of a hippopotamus with the jaws opened to display the teeth.

and aquatic plants on which it feeds; also for fighting enemies and rival bulls. Hippopotamuses are apt to be quarrelsome, and travellers as well as sportsmen mention that the hides of the cows, as well as those of the bulls, are often well-scarred.

When hunted or wounded, a hippopotamus will

attack and overturn a canoe or a boat; it will also perforate the boat with its teeth, and sometimes bite pieces out of it.

Hippopotamus-ivory was formerly used for making artificial teeth. Sportsmen often keep the incisors and canines as trophies, and natives split large tusks and wear them as ornaments or as charms.

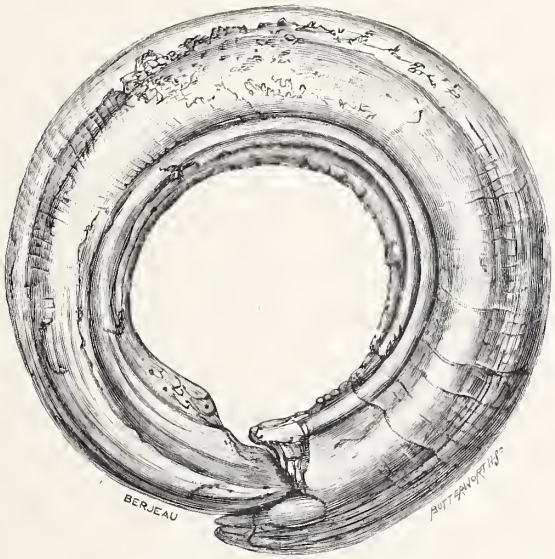
On land the hippopotamus is an ugly and apparently awkward brute; its legs are very short in proportion to its body, which resembles a black hogshead on short supports. The feet are short and broad; the toes, unequal in length, are furnished with rounded hoofs, all of which reach the ground in walking and leave easily recognised marks in soft, sticky mud. The broad feet do immense damage to the growing crops of the natives, especially as hippopotamuses live in herds consisting of twenty to forty individuals. They eat grass in enormous quantities, which they are able to crop quite close. The stomach is complex, and capable of holding five or six bushels of grass and aquatic plants.

In spite of apparent clumsiness the hippopotamus can make its way up a steep bank with remarkable quickness. In the favourite haunts a hippopotamus track is often a tunnel through reeds, papyrus and brushwood on the banks of a river, lake, or back-water. These animals feed principally at night, and sportsmen take advantage of this fact to shoot them, for when killed in deep water they sink, but after two hours or more, when the gases of decomposition accumulate in the belly, the carcase floats, and can be towed into the shallows and rolled ashore.

The body of a hippopotamus is useful to the natives. Its flesh is eaten, often uncooked. The skin is thick, and almost hairless. There are tufts of hair on the lips, around the margin of the ears, and at the tip of the tail. The hide is often two inches thick; it is used for making whips, bridles, hobbles, etc. The

Swahili name for the hippopotamus is Kiboko, and a dried strip of the hide is used instead of a whip or cane when riding, and replaces the cane for corporal punishment. Its application to the bare back of a porter or a culprit causes more pain than a whip or a cane.

During the day hippopotamuses remain concealed in the reeds or rushes, or in the water. In places where they are much disturbed they expose themselves



The canine tooth of a hippopotamus which has grown into a complete circle. It is difficult to imagine the agony caused by such an untoward condition. (Museum, Royal College of Surgeons, England.)

very cautiously. As a rule, the body is submerged and the head alone exposed. When danger threatens, the head disappears below the surface, and the nostrils are voluntarily closed as the animal sinks under water. The hippopotamus is not only an expert swimmer, but runs quickly along the bed of the river, and can remain under water from five to eight minutes; it then cautiously raises its head to breathe, exposing only the

nostrils, nasal surface of the face, orbits, ears and eyes (see p. 178). Like the whale, it sometimes blows before reaching the surface, and drives up a watery column, or a spray of water. Often a blowing grunt or bellow is heard before the head appears. When shot at, these uncouth beasts become very cautious and forsake the clear parts of a pool and lie with their noses hidden among the reeds.

Unless taken unawares, the hippopotamus when in the water offers a small target for the sportsman. It is usual to aim at a spot an inch behind the eye and near the base of the small erect ear. A bullet in that position penetrates the brain case. When shot dead the animal turns over, the feet stick up, and the body sinks like a stone to refloat about two hours later. When badly wounded the hippopotamus flounders about, and churns up the water in a sort of death-struggle like the flurry of a mortally wounded whale. A wounded bull is a dangerous animal, and will attack a boat with great ferocity. Hunters have been drowned on several occasions by wounded hippopotamuses. There are many reliable reports in which natives and Europeans have been attacked by these animals when crossing the Victoria Nyanza. The natives kill the hippopotamus by means of game pits dug in their tracks, or with harpoons and spears (see p. 54).

It is believed by many that a lion cannot kill a hippopotamus, but Gregory relates that when he was on the banks of the Thika-Thika, three lions had surprised a hippopotamus in some long grass about thirty yards from the river. There had been a desperate fight; the grass had been trampled down for yards around, but the hippopotamus had finally succumbed to loss of blood. The skin was terribly scratched by claws and teeth, and the lower part of the neck had been torn away.

Livingstone regarded the hippopotamus as an animal which spends its life mainly in the water in a sort of listless dream. He watched them at play, when the

very small calves sit on the necks of the cows with their "little sauey looking heads cocking up between the old one's ears; as they beeome older they sit on the withers"(see p. 55).

It is interesting to wateh these huge animals at play, splashing about the shallows and opening their huge eavern-like mouths as if anxious to take in air by the mouthful. Powell-Cotton watehed a sehool of eleven hippopotamuses at play in Lake Tsana; among them were two ealves gambolling and trying to scramble on the old one's baek; when they sueeeeded she would quietly roll over and send them plump baek again into the water. There is something very human in this kind of motherly fun.

In the rivers and lakes of Eastern Ethiopia the hippopotamus will defy extinetion until this equatorial region is eivilised and the sudd obstruetions in the affluents of the White Nile are abolished: until then its ugliness and corpulence will exeite wonder in many future generations of men, black and white.

A thorn in the foot. This is seen daily as a "living statue" in Eastern Ethiopia.

INDEX

INDEX

A

Aard-vark, 185
Aard-wolf, 335
Acacia fistulosa, 256
  grove, 257
Ambatch, 246
  canoes, 248
Ampullaria, 339
Ant-bear, 185
Ant-eater, 65
Antelopes, 276
Anthills, 69, 302, 327

B

Baganda, 58
Bagrus docmac, 28
Bahr-el-Gebel, 2, 405
Bahr-el-Ghazal, 344
Balæniceps, 344
Bamboo forests, 239
Banana, 62
Baobab, 9
Bark cloth, 81
Beaks, 337
Bee-eaters, 377
Bees, 133
Billiard balls,
Bishop finches, 371
Boats, Uganda, 48
Bubemba, 44
Buffaloes, 193
Buffbacked herons, 193
Bulinguge, 43
Bushbuck, 277
Bush-shrikes, 200
Busoga, 28
Bustard, 183, 378

C

Castor oil plant, 10
Cathedral, Uganda, 76
Chameleons, 71, 275, 358
Charms, 152
Chats, 197, 355
Chignons, 158
  of Dodinga, 162
  of Karamojo, 159
  of Mashukulumbi, 163
  of Shilluk, 161
  of Suk, 157
  of Turkana, 157
Colobus, 137
Coly, 371
Cormorant, 29, 346
Coucal, 380
Cranes, crowned, 362
Craters, 226
Crests, 354
Crocodiles, 213
Cuckoo, lark-heeled, 380

D

Dancing-birds, 368
Darters, 344
Defassa, 186
Dhurra-birds, 371
Dik-Dik, 293
Dinka, 161
Dodingas, 162
Dog, wild, 305
Donkey, 189
Dove, long-tailed, 385
Drums, 83
  Ashantee, 88
  Niam-Niam, 91

Drums (*continued*)—
Uganda, 84
Wa-Kamba, 86
Duikers, 303

E

Eagle, 29, 379
Ear-ornaments, 118
Ja-luo, 164
Kikuyu, 123
Masai, 119
Ndorobo, 133
Eland, 282
Elephant, 387
cemetery, 190
Elephant trap, 394
spears, 132
Elgon, 226, 235
Entebbe, 56, 68
Escarpments, 227

F

False dawn, 12
Fetish-hut, 47, 67
Fire-making, 136
Fires, grass, 182
Flamingo, 171, 249, 351
Flies, tsetse, 319

G

Gazelles, 287
Grant's, 288
Thomson's, 16, 288
Waller's, 290
Gecko, 12
Genet cat, 71
Gerenuk, 290
Gnats, 33
Gnus, 299
Grass fires, 182
Groundsel-groves, 239
Guereza monkey, 138
Guinea fowl, 192

H

Hair-dressing, 156
Dinka, 161
Dodinga, 162
Ja-luo, 164
Karamojo, 159
Masai, 158
Mashukulumbi, 163
Nandi, 157, 159
Shilluk, 161
Suk, 157
Turkana, 157
Wa-Kikuyu, 157
Hammerhead, 356
Harpoons, 53
Hartebeest, 300
Harvesting-Ants, 176
Heath-trees, 240
Herons, buff-backed, 221
white, 355
Hippopotamus, 53, 178
Honey-barrels, 106, 108
Honey guides, 197
Hoopoes, African, 359
English, 360
Hornbills, 340
Horns, 266
annulated, 269
spiral, 268
of antelopes, 276
of chameleon, 275
of deer, 266
of giraffe, 266
of hartebeest, 272
of kobs, 297
of kudus, 285
of oryx, 269
of oxen, 266
of rhinoceros, 274
of roans, 271
of wildebeest, 301
Hyæna, 115
Hyrax, 194

I

Ibis, 178, 339
Impalla, 174, 289
Iron, smelting of, 136
Islands, 41
Bridge, 42
Bubemba, 44
Bugaya, 45
Bulinguge, 43
Busiri, 45
Buvuma, 45, 48
Kabulataka, 224
Kome, 44
papyrus, 30
Rusinga, 42
Sentinel, 42
Sesse, 43
Ukerewe, 41
Ivory, 387

J

Jacana, 35
Jigger, 81, 307
Jinja, 27

K

Kabaka, 82
Kampala, 68
Kansu, 58
Karamojo, 159
Kavirondo, 140
  Gulf, 30
Kenia, 226, 237
Kerosine tin, 24
Kigelia, 262
Kilimanjaro, 226, 237
Kilindini, 11
Kisumu, 15, 27
Kite, 181
Kob, 291
  Mrs. Gray's, 297
  Uganda, 298
  white-eared, 298
Kome, 44
Kongoni, 300
Kraal, 102
Kudu, 280
Kuloll, 236
Kungu fly, 33

L

Labrets, 127
Lake Baringo, 245
  Elmenteita, 244
  Hannington, 247
  Magadi, 251
  Natron, 251
  No. 2
  Nyasa, 229
  Rudolf, 249
  Soda, 251
  Stefanie, 450
  Tanganika, 230, 334
  Victoria, 27
Lakes, 243
Lark, 380
Lark-heeled cuckoo, 380
Lepidosiren, 35
Lily-trotter, 35
Lion, 201
Lobelias, 240, 377
Lubare worship, 46

M

Manis, 66
Marabou, 348
Marsh-buck, 33
Masai, 92
Mau escarpment, 20
  forest, 279, 341
Mengo, 68
Mombasa, 4
Monitor, 219
Mountains,
  Aberdare, 227
  Donyo Buru, 236
  Elgon, 227, 235
  Kenia, 227, 239
  Kilimanjaro, 226, 239
  Kinangop, 227
  Kuloll, 236
  Longonot, 21, 232
  Menengai, 228
  Ruwenzori, 226, 239
  Suswa, 233
  Teleki, 236
Mrs. Gray's kob, 297
Mudfish, 35
Mukasa, 44
Mumias, 80
Murchison Bay, 56, 224
Mutesa, 64
  tomb of, 75
Mwanga, 57

N

Nagana, 324
Nairobo, 17
Naivasha, 21
Nandi, 25
Napoleon Gulf, 27
Nightjars, 383
Nile, 27
Nya-luo beads, 164
Nyando valley, 21

O

Open-bill, 338
Organ-shrike, 198
Oribi, 294
Ornaments, 118
  Arm clamps, 94, 157
  Ear-buckets, 133
  Ear-rings, 112, 123
  Feather, 162
  Helix-quills, 124
  Labrets, 127

Necklaces, 128, 294
Pelele, 127
Shells, 128, 153, 162
Stones, 122
Tails, 385
Tusks, 386
Oryx, 284
Ostrich, 16
Oxpecker, 192, 389

P

Palla, 289
Papaw tree, 7
Papyrus, 39
islands, 30
Pelele, 127
Bongo, 127
Mittoo, 129
Murle, 128
Pelican, 347
Pests, 307
flies, 318
gnats, 313
jiggers, 307
mosquitoes, 313
termites, 327
ticks, 309
tsetse flies, 319
Pistia stratiotes, 31
Plantain-eaters, 361
Plovers, 192, 221
Proteles, 335

R

Reedbuck, 170, 292, 296
Rift-valley, 227
craters in, 227
lakes in, 243
Ripon Falls, 28
Roan antelope, 283
Ruwenzori, 226

S

Saddle-billed stork, 355
Sand-flea, 307
Scarification, 145
Scissor-bill, 349, 352
Sea-eagle, 28
Secretary bird, 356
Serval, 175, 179
Sesse Archipelago, 43
Shilluks, 161
Shrikes, 198, 200, 365, 373
Sing-Sing, 186
Skimmer, 349, 352
Skull of antelope, 268
hartebeest, 271, 272
hippopotamus, 405
hippotragus, 297
hyæna, 116
kob, 297
proteles, 336
Smelting, 136
Soda lakes, 251
Speke's antelope, 33
Spirit-shelters, 40
Starlings, 192
Steinbok, 292
Stilt, 196
Sudd, 31
Sunbirds, 240, 374

T

Tails of birds, 367
of elephants, 274
of Kavirondos, 142
Tattoo, 145
Tecoma, 375
Teeth of antbear, 184
of crocodile, 216
of earthwolf, 336
of elephant, 387
of hippopotamus, 405
of hyæna, 116
of hyrax, 194
Termites, 327
Thorn-orchard, 256
Thorns, 252
on acacias, 255
on agaves, 253
on erythrina, 257
on euphorbia, 257
on sanseviera, 252
sisal, 253
Topi, 303
Top-knots, 354
Touraco, 361
Tribes :
Baganda, 58
Bassese, 43
Bongo, 127
Dinka, 161
Dodinga, 161
Ja-luo, 164
Kavirondo, 140
Kikuyu, 105
Masai, 92
Mittoo, 127
Murle, 127
Nandi, 25, 157

Ndorobo, 131
Shilluk, 161
Wakerewe, 41
Wavumu, 45
Trochilus, 221
Trumpets, 285
Trypanosome, 323
Tsetse fly, 319, 326
Tusk, boar, 406
bullets in diseases of, 392
elephant, 389
fetish, 399
hippopotamus, 405
mammoth, 388
spiral, 397
warthog, 172

U

Uganda, 56
Cathedral, 76
Kob, 298
railway, 11
Ukamba, 17
Umbilical cord, 86
Umbre, 356
Usoga, 28, 42

V

Varanus, 219
Victoria Nyanza, 27
Villages,
Kavirondo, 149
Kikuyu, 109
Kissi, 150
Masai, 102
Volcanoes, 235
Vultures, 11, 26, 181

W

Warthog, 172
Waterbuck, 186, 297
Weaverfinch, 368
Whaleheaded stork, 343
White-ants, 327
White-eared kob, 298
Whydah birds, 368
Wildebeest, 299

Z

Zebra, 187
Zodiacal light, 13

R. CLAY AND SONS, LTD., BRUNSWICK ST., STAMFORD ST., S.E., AND BUNGAY, SUFFOLK.

DATE DUE

DEC 1 '66

JUN 30 2010

JUN 30 2011

GAYLORD

PRINTED IN U.S.A.

DT425 .B64
Man and beast in eastern Ethiopia.
Princeton Theological Seminary-Speer Library
1 1012 00023 8412